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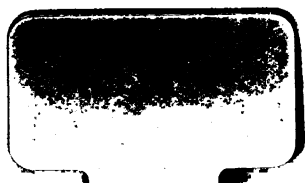
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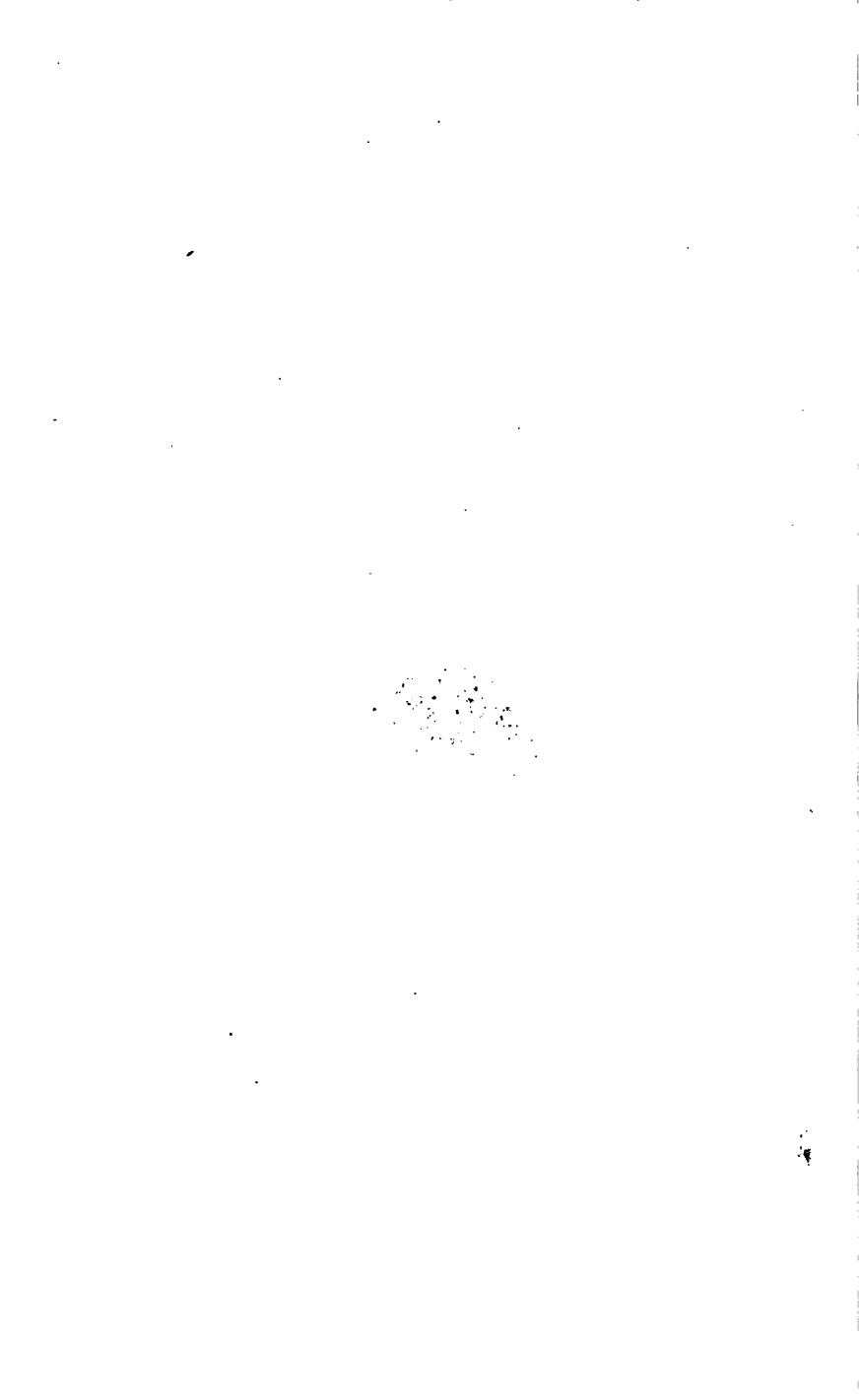




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*W. B. Barlow*

# AUSTRALIA AND ITS GOLD FIELDS:

## A Historical Sketch

OF THE

PROGRESS OF THE AUSTRALIAN COLONIES, FROM THE EARLIEST  
TIMES, TO THE PRESENT DAY;

WITH A PARTICULAR ACCOUNT OF

THE RECENT GOLD DISCOVERIES,

AND OBSERVATIONS ON THE

PRESENT ASPECT OF THE LAND QUESTION.

TO WHICH ARE ADDED

NOTICES ON THE USE AND WORKING OF GOLD IN ANCIENT  
AND MODERN TIMES;

AND AN

EXAMINATION OF THE THEORIES AS TO THE  
SOURCES OF GOLD.

BY

EDWARD HAMMOND HARGRAVES,

Late Commissioner of Crown Lands in New South Wales.

WITH A MAP, AND A PORTRAIT OF THE AUTHOR.

LONDON:

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## Dedication.

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TO SIR CHARLES AUGUSTUS FITZROY,

K.C.B., &c. &c. &c.,

LATE GOVERNOR-GENERAL OF AUSTRALASIA.

---

SIR,

I BEG leave, most respectfully, to dedicate to you the following pages, in testimony of my admiration (a feeling shared by the whole community of my fellow-colonists) of the liberal, enlightened, and statesmanlike policy pursued by you, during a period of great excitement and difficulty, consequent upon the discovery of the vast gold fields in Australia—a policy, which whilst loyally upholding the rights of the Crown, has so happily resulted in the maintenance of public order, and the encouragement of individual industry and commercial enterprise.

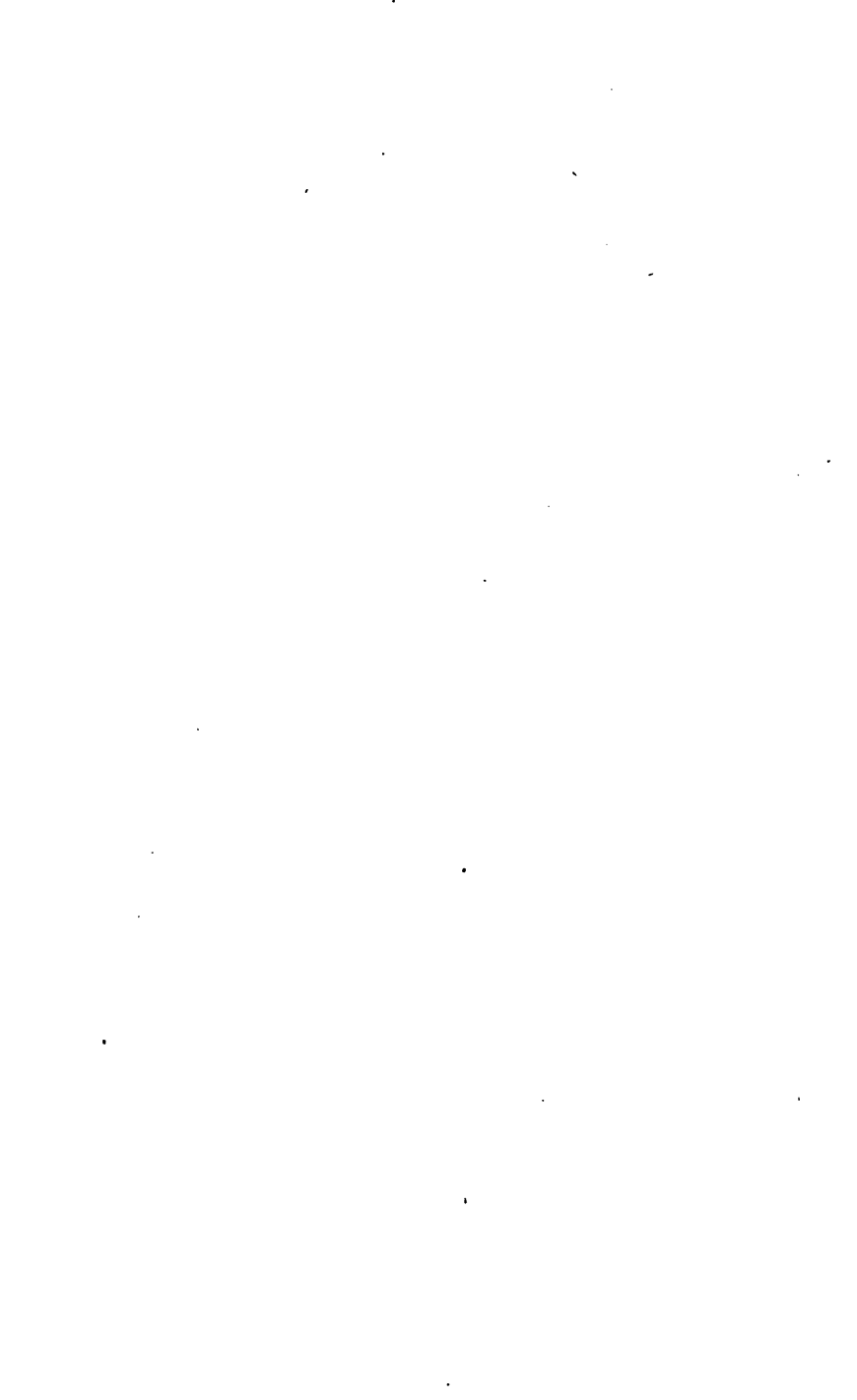
I have the honour to subscribe myself,

Your most Obedient

and Humble Servant,

E. H. HARGRAVES.

LONDON, 21<sup>st</sup> DECEMBER, 1854.



## PREFATORY OBSERVATIONS.

---

IN producing the present unpretending volume, my chief object has been to supply a faithful record of the circumstances which led to, and attended, my discovery of the Gold Fields in Australia, about four years ago. I have undertaken the task with some diffidence and reluctance, and at the urgent request of several of my fellow-colonists, who considered that it was incumbent upon me thus to supply materials to fill up what would otherwise be a gap in a very important period in the history of the Colony.

Having taken up the pen, it struck me that, in connection with my principal subject, it might be acceptable if I gave some account of the early history of the Colony; and of Gold itself, both amongst the ancients and the moderns—more especially the discoveries by

the Spaniards in America, and the more recent discoveries in California. I have also briefly sketched some of my adventures and observations, both in the latter country and in Australia; and, to conclude, have touched upon the land question in Australia—a subject which, I fancied, could not be without interest, more especially at the present juncture, when a new constitution is about to be conferred on the Australian Colonies.

In addition to my own lucubrations, I have appended two valuable papers on a New Theory of the Origin of Gold, communicated to me by my friend Mr. DAVISON, which, I doubt not, will be perused with attention and interest.

It has been suggested to me, further, that it would not be out of place if I prefaced my work with a few words as to my antecedents, in order to gratify any curiosity the reader might feel as to “who was the discoverer of Australian gold.” In obedience to these suggestions, and in anticipation of any such inquiries, let me briefly state that I am the third son of JOHN EDWARDS HARGRAVES, Esq.,

and was born at the close of the last war, at Stoke Cottage, Gosport, near Portsmouth, then the residence of my maternal grandfather, MAJOR WHITCOMBE. My father, at that time, was a Lieutenant in the Sussex Militia, and I was literally ushered into existence while that regiment was on the march, and followed my father's company ("in arms," of course) at the age of six weeks. My elder brothers (now no more) were fortunate enough to have received much greater advantages on setting out in life than I had, being each presented to appointments in the East India Company's naval service; whilst I, at the age of fourteen, found myself launched into the active world on the deck of a merchant-ship. I toiled at sea for three years incessantly, in the course of which time I saw most parts of the world, and had my full share of hardship in various forms.

At the age of seventeen, I found myself in Australia, and before eighteen was a proprietor of cows and bullocks, being what is termed a settler, or "squatter," in that country. At this time I was married, and at nineteen was

a parent ; early enough, it will be said, for a young man to marry, and have the cares and troubles of life crowd in upon him ; but such is the case sometimes in new settlements. During all this time my means were very limited, consisting merely of such stock and produce as I could raise—always working myself ; for in a colony where one settles in a hitherto almost untrodden wilderness, everything depends on a man's putting his shoulder to the wheel ; failing to do this, the settler is literally very soon “settled.” And I would here strongly advise all emigrants not intending to do likewise, to take a “return ticket.”

Well, reader, I was industrious and frugal. and met with my reward ; built houses, as the proverb says fools do, and saw wise men living in them. As an illustration of this sort of speculation, I may mention that I let a house with thirteen rooms in it for 2s. 6d. per week, and one with nine for about the same sum ; and that, after repeated threats from my tenants to leave the houses, unless

I reduced the rent, they actually did so. This was in 1846. In 1849, at the time I went to California, things in the colony had very little improved ; as to money, we scarcely knew anything of it, except by name. I was, however, fortunate enough to pass through this crisis, and pay 20s. to the pound, in which I may add I was much more fortunate than most of my neighbours ; for in the years 1841, 1842, and 1843, there was almost a general bankruptcy throughout the colony—I may say throughout Australasia. Boiling down the sheep and cattle, for their *fat*, first brought relief to the country, and astonished the *Russians*, who had hitherto chiefly supplied the London market with tallow. Australia, later, followed up this important advantage and rivalry with Russia, by producing “gold,” literally and truly the sinews of war.

The amount of reward the Colonial Government have bestowed upon me for my discovery of Australian gold is mentioned in the course of my narrative on that subject. I should be most ungrateful, however, if, in these pages, more



particularly relating to my personal history, I omitted to mention the liberal testimonials I have received from my brother colonists in further acknowledgment of the importance and value of that discovery. The town of Sydney gave me a pure gold cup, of the value of £500 sterling, and bearing the following inscription:—“*Palman qui meruit ferat. Presented to EDWARD HAMMOND HARGRAVES, Esq., J. P., Commissioner of Crown Lands, by his fellow-colonists, in testimony of their appreciation of his eminent services in the discovery of the Australian Gold Fields on the 12th day of February, 1851.*” The presentation of this magnificent testimonial took place at a public dinner, at which were present the Governor-General, the Colonial Secretary, and all the high officers of the Government. From Melbourne I received a gold cup of exquisite workmanship, and with appropriate inscription, filled with sovereigns. From Bathurst, a silver tea and breakfast service, with appropriate inscription, presented March, 1853, at a public dinner. I was also honoured by being invited to public dinners

at Moreton Bay, Melbourne, Mudgee, and most places throughout the colony. Amongst other offerings, given in the kindest spirit by individuals;—Messrs. BUSH and MACDONALD presented me with a valuable gold watch; and lastly, on the moment of my departure from Melbourne, WALTER POWER, Esq., a gentleman whom I had never seen, sent me, through a friend of his, the sum of £250 as his private testimonial, begging my acceptance of it as a slight tribute of esteem and respect for one to whom he, in common with his fellow-colonists, felt himself so deeply indebted, for services rendered to the colony by the discovery of the Gold Fields.

E. H. HARGRAVES.

7, UPPER SPRING STREET, PORTMAN SQUARE,  
*London, 22nd December, 1854.*



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## ERRATA.

- Page 24, 11th line, *for Blastane read Blaxtone.*  
 24, 4th line from bottom, *for Munanbridge read Murrenbridge.*  
 76, 7th line from bottom, *for Woodstock read Wood's Creek.*  
 83, bottom line, *for Hood's Creek read Wood's Creek.*  
 117, 11th line from top, *for Bunandong read Burrandong.*  
 135, 13th line from top, *for Queen's read Ovens.*  
 „ 18th line from top, *for Queen's River read Ovens.*  
 139, Index, *for amount of gold read account of gold.*  
 140, 16th line from top, *for Steymon read Strymon.*





A

# AUSTRALIA AND ITS GOLD FIELDS.

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## CHAPTER I.

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### HISTORICAL REVIEW OF THE COAST AND INLAND DISCOVERIES IN AUSTRALIA.

First discoveries on the coast line of Australia—Louis Val de Torres in 1605—The Dutch yacht *Dugfhen*, commander's name unknown—Dirk Hartog in the *Endraght* makes discoveries on the west coast—Successive discoveries of the Land of Edel, of Cape Leeuwin, of Nught's Land, of Staten Island, and of Van Dieman's Land by the Dutch—Dampier's visits to the western coast—Cook's important discoveries; Point Hicks, Botany Bay, and Port Jackson—First colonisation by English convicts in 1787—Scarcity of provisions, and extraordinary inducements offered to persons undertaking farming pursuits—Progress of the Colony traced—Discovery of Bass's Strait in 1785—Bass sails round Van Dieman's Land, 1797—Introduction of Spanish Merino sheep, 1803—Prosperity of the Colony under General Macquarie's rule—Produce of wool at various periods between 1819 and 1850—But the wealth of Australia not in wool alone, but in gold also.

BEFORE entering upon the more attractive subject of the gold mines of Australia, and gold in general, I propose to give a short account of the gradual discovery of this important territory itself; first of its coast line at various points, and afterwards of various portions of its interior, interspersing throughout my

narrative notices of the most important events in the history of the principal colony, that of New South Wales.

I am the more induced to devote this, my first chapter to a rapid sketch of the geographical history of Australia, because I believe it is a subject of which very little is known to the generality of persons. Many works indeed have been recently published, which give accounts far more copious than I shall pretend to do on the subject; but I believe that, owing either to the bulk and expensive character of these publications, or other causes, their contents have not been generally availed of by the numerous class of persons now directly interested in the history and prospects of this important colony. Add to this, that in the schools devoted to polite learning, the very name of Australia, much less her history and interests, has hardly been deemed entitled to more than a passing mention, as that of a very extensive but almost unknown quarter of the globe.

Under these circumstances, I consider that I may, in the short space of a single chapter, in some measure fill up a gap in the geographical and historical knowledge of many general readers, whilst to those directly interested in the colony, I supply information upon her local history, which may not be unacceptable.

To begin then with the earliest discoveries of the coast line of Australia. The first person who is recorded by name as having seen any part of that coast was the Spanish navigator named Luis Val de Torres. He had been sent out as second in command to Pedro Fernandez de Quiros, when in the

year 1605 that officer sailed with three vessels from the port of Callao in Peru, in search of the then unknown but supposed great Southern Land. Quiros reached a land which he considered to be that of which he was in search, and to which he gave the name of Australia del Espiritu Santo (Australia of the Holy Ghost); but the three ships being subsequently dispersed in a storm, Quiros returned home without further prosecuting his search, while Torres continued his course westward and passed through the strait which has since immortalised his name, and, in doing so, sighted the northern extremity of Australia at Cape York.

Such, however, was the jealousy of the Spanish Government, that the account of Torres' discoveries remained a secret to the world, until the year 1762, when Manilla being taken by the British forces, Mr. Dalrymple found the copy of a letter which Torres had addressed to the King of Spain, and which copy he had lodged in the archives of Manilla. With a generosity worthy of his country, Mr. Dalrymple at once published this interesting document, and named the strait above mentioned "Torres' Strait," thus giving the first known discoverer the honour which was his due. This discovery was made in August, 1606.

Some months earlier in the same year, however, a Dutch yacht, named the Dugfhen, had been sent from Bantam to explore the island of New Guinea, and coasting along what was thought to be the west side of that country, reached to the  $13\frac{1}{2}$  deg. of south latitude; thus entering the Gulf of Carpentaria almost at the very time when Torres was nearing

the strait which leads from the eastward into that gulf. The name of Cape Keer-Weer, or "Turn-Again," was given to the furthest point that the Dugfhen reached. Unfortunately the name of the commander of the Dugfhen has not been preserved; which alone justifies my previous statement of Torres having been the first known discoverer of any part of the coast of Australia.

Of Spanish voyages of discovery to the same coast we hear no more; nor did the Dutch for a long period designedly attempt to prosecute any further discoveries. But, in the year 1616, Dirk Hartog, commander of the ship *Endragt*, outward bound from Holland to India being driven out of his course, fell in with the west coast in latitude about  $26\frac{1}{2}$  deg. south; from hence he sailed northward along the coast to about latitude 23 deg., and gave it the name of *Endragt's Land*. On one island which still bears his name, and which lies at the entrance of what our own countryman, Dampier, afterwards called *Shark's Bay*, Dirk Hartog left the following inscription on a plate of tin:—

"Anno 1616, the 25th of October, arrived here the ship *Endragt*, of Amsterdam; the first merchant Gillis Miebaïs of Luik, Dirk Hartog of Amsterdam, captain. They sailed from hence for Bantam, the 27th D°."

On the lower part, as far as could be distinguished in 1697, was cut with a knife—

"The under merchant, Jan Stins; chief-mate, Pieter Dookus, of Bill. A° 1616."

This plate was discovered first in 1697, and again in 1801. But in the following year it was removed,

I believe, by the French captain, Nicolas Bouda, and it is now in one of the public museums of Paris.

In the year 1619, another outward-bound Dutch ship accidentally fell in with land at about the 29th deg. of south latitude, and continued its course northward to  $26\frac{1}{2}$  deg., where Dirk Hartog's discovery commences; this part of the coast was called the Land of Edel, from the name of the commander.

Again, in 1622, another Dutch ship, called the Leeuwin, which means lioness, fell in with the southwestern point of the continent of Australia, from whence it has derived the name of Cape Leeuwin, a point which is always anxiously looked for, or its meridian calculated, by emigrants from this country, as giving the first promise of a speedy arrival at their destined port. The name of the commander of the Leeuwin is unknown.

In January, 1636, the Dutch Governor of Amboina sent out the yachts Pera and Arnhem, under the command of Jan Carstens, to further prosecute the researches that thirty years before had been commenced by the Dugfhen. Carstens, however, with eight of his crew, was murdered by the natives of New Guinea; and though the vessels continued their voyage, and discovered the great islands of Arnhem and Spult, one of them only reached about 3 deg. further south than Cape Keer-Weer. "In this discovery," the report of that voyage states, "were found everywhere shallow water and barren coasts; islands altogether thinly peopled by divers cruel, poor, and brutal natives."

In April 1636, Gerrit Thomas Pool was sent from

Banda, with two other yachts, on the same expedition as Carstens, and met with the same fate at the same place. The voyage was, however, continued by the supercargo, Pieter Pietercon; but he being unable to reach the supposed west coast of New Guinea—that is, the east side of the Gulf of Carpentaria—shaped his course south, and discovered the coast of Arnhem, or the northern Van Dieman's Land, and sailed along the shore for 120 miles “without seeing any people, but many signs of smoke.”

In the meanwhile a more considerable discovery to the south of Australia had been made by Pieter Nugts, in the ship *Gulde Zeepaard*.

He, in the year 1627, being accidentally driven from his course on his way to India, fell in with land near Cape Leeuwin, and sailed along the coast for the space of a thousand miles, whence it took the name of Nugt's Land.

But the most important, as well as the last of these early discoveries, were those made by Abel Janz Tasman, who sailed from Batavia, on the 14th of August, 1642. One of the main objects of this expedition was to discover how far southward the Terra Australis extended. He first fell in with land at  $42\frac{1}{2}$  deg. south latitude, and having landed on two or three parts of the coast, rounded the extreme southern part of that land, and, taking an easterly course, discovered New Zealand, to which he gave the name of Staten Island.

Tasman had been sent out on this mission by Antony Van Dieman, Governor of Batavia, to whose daughter Maria he is said to have been engaged. Out of respect to his master, he called the newly-dis-

covered country Van Dieman's Land, though it is to be hoped that in time to come it may bear a name derived from that of its discoverer:—Tasmania. Nor did Tasman fail to leave tokens of his attachment to the fair Maria; like Shakspeare's Orlando, he wrote his lover's name, not, indeed on the perishable bark of trees, but on the more enduring headlands and islands that he discovered; thus he named a point on the eastern coast of Van Dieman's Land, Cape Maria, and gave the same name to an island in the vicinity. The latter has of late become somewhat famous as the receptacle of some of the Irish state convicts, a use to which Tasman probably would not readily have applied the spot which he chose as a monument commemorative of the object of his affections.

In a second voyage, undertaken in 1644, the same navigator traced the western shores of the Gulf of Carpentaria, as well as a considerable extent of coast lying further to the west.

He had been sent out for the express purpose of ascertaining whether New Guinea "was divided from the great known south continent or not." He failed in the main object of his expedition, though, as has been observed at the outset, Torres' voyage, had its results been made known to the public, would long before have set that question at rest.

It is hardly necessary to notice the three visits of Captain Dampier to the western coast of Australia, the first in 1688, the second in 1697, and the last, 1699. The fact of their occurrence is interesting to us, chiefly because he is the first of our countrymen who visited any part of Australia. He added scarcely anything to prior discoveries, having touched



at the same point where Dirk Hartog had been seventy years previously, and having extended his discoveries to the 16th deg. of south latitude.

Thus far the general outline of most of the northern and western coasts, of the southern, as far as Nugts had reached, and a portion of the south-western and southern coasts of Van Dieman's Land, had been traced by various navigators during this century. Van Dieman's Land was supposed to form part of the mainland of Australia. The southern coast, beyond the parts explored by Nugts, and the whole of the eastern coast, being utterly unknown.

No further discoveries appear to have been attempted until 1770, when Captain Cook, having been sent out in the *Endeavour* to observe at Tahiti the transit of Venus over the sun's disc, after having accomplished that object, continued his course westward for the purpose of exploring the eastern side of the unknown Terra Australia, as it was then called. On the morning of the 19th of April, 1770, land was seen bearing from north-east to west, at about 38 deg. south latitude, that is, about 250 miles south of Sydney. To the point first discovered Cook gave the name of Point Hicks, in honour of the lieutenant who first sighted land. It is to be regretted that this name is omitted in many of the modern maps of Australia; for nothing more incites men to a noble emulation than this hope of having their names handed down to posterity in connexion with the hardships they have undergone, and the successes they have achieved.

It would occupy too much to follow our great navigator in his discoveries along the coast from

Point Hicks to Cape York, a distance northward, in a straight line, of between 1,600 and 1,700 miles. If any books of voyages are more read than others, they are probably those of Cook. Suffice it, therefore, to mention, that Cook entered the inlet a few miles below the harbour of Port Jackson, to which, from the great number of new plants found on its shores, he gave the well-known name of Botany; and that he passed without notice the narrow opening that leads into the magnificent harbour of Sydney, merely designating it after the fortunate sailor who was at the time at the masthead, and whose duty it was to report all that he saw of interest, whence it took its name of Port Jackson. To the whole territory now discovered, Captain Cook gave the name of New South Wales. Of the many voyages that had been made to this great southern land, that of Cook's was the only one that led to any practical result. He, indeed, was the first of the many discoverers who had met with an available harbour, though that which he did find was altogether inadequate, both as to convenience and situation, to the wants of even a small community.

The principal, if not the sole occasion of the colonisation of New South Wales was, the separation of the North American colonies from the mother-country. The utter inability felt by the British Government to provide for the security and proper employment of persons convicted of having offended against the law, made it necessary to look out for some new penal settlement. The western coast of Africa was tried; but the trial failed. The Government, therefore, resolved on planting a colony on the

shores of Botany Bay. Convicts were to act as pioneers; but it was contemplated from the very first that inducements should be held out for free settlers to resort thither.

On the 13th of May, 1787, "the first fleet," as it is called, sailed from Portsmouth. This fleet consisted of the *Sirius* frigate, the armed tender, *Supply*, three store-ships, and six transports. The expedition was placed under the command of Captain Phillip, the first Governor of the colony.

Some one, I forget who, once said that the population of New South Wales might be divided into those who had been convicted, and those who had not been convicted. And this division, though its irony is obvious enough, will suit my present purpose. The unconvicted portion, then, consisted of the governor, a major commandant, a judge-advocate, a commissary, a surveyor-general, 4 surveyors for the colony, a chaplain with his wife and servant, 18 commissioned and 24 non-commissioned officers, 168 rank and file, 28 women the wives of soldiers, with 14 children; besides these there were 4 women (who from Collins' account seemed to have belonged to nobody) and a few artificers, of whom the numbers are not given; in all, exclusive of the artificers, 268 free persons. The convicted portion consisted of 564 males and 192 females, with whom may be classed 6 male and 7 female children belonging to the convicts; in all, 769 of this class; making a total of convicted and not convicted, taken together, of 1,037 souls.

This fleet, after a voyage of eight months, during which it touched at Teneriffe, Rio de Janeiro, and

the Cape of Good Hope, anchored at Botany Bay on the 20th of January, 1788.

Within a very few hours after he landed, Governor Phillip satisfied himself that the spot selected was utterly unsuited for the site of a colony, on account of the inconvenience of the harbour, the poverty of the soil, and the deficiency of fresh water. He therefore set out with three boats for the purpose of exploring Broken Bay, an inlet about eighteen miles to the north, of which Cook, though he had not entered it, had spoken favourably. As he skirted the barrier of cliffs that line the coast, he resolved on examining the narrow opening which Cook had passed without notice, only giving it the name of the sailer on the look out. Captain Phillip expected to find nothing better than a boat-harbour, but was surprised and delighted at finding not only shelter for a boat, but a harbour capable of affording security to the combined fleets of all Europe. In one of the coves, therefore, of this noble and capacious harbour he determined to establish the settlement.

It was Captain Phillip's intention to remove the fleet from Botany Bay on the following day (the 26th of January), but he was surprised at daylight at seeing two strange sail in the offing. These were two French ships, the *Boussole* and *Astrolabe*, then on a voyage of discovery, under the command of Monsieur de La Perouse. La Perouse had sailed from France in 1785, and having heard at Kamskatcha of the intended settlement, expected to have found a town built and a market established. The French ships remained in the harbour of Botany Bay until the 10th of March, in order to refit; and

having then set sail, were never heard of more until the year 1826, when Mr. Dillon discovered that the ships had been wrecked at the island of Manicollo (or Vanicolo) in the Pacific, and their crews murdered by the natives. A monument has been erected at Botany Bay to the memory of La Perouse and his crew.

On the 26th of January, the fleet, having been brought round from Botany Bay, anchored in Sydney Cove—so called after Lord Sydney, then one of the Lords of the Admiralty—where, the formalities of taking possession of a new territorial acquisition were gone through. A party of marines and sailors were landed, the union jack was hoisted, several volleys were fired, while the governor, and the officers that accompanied him, drank the king's health and success to the colony. On the following day the disembarkation of the troops and convicts took place. "The confusion that ensued," writes Collins, one of the earliest and most accurate historians of New South Wales, "will not be wondered at, when it is considered that every man stepped from a boat literally into a wood. Parties of people were everywhere heard and seen variously employed; some in clearing ground for the different encampments, others in pitching tents or bringing up such stores as were more immediately wanted; and the spot which had so recently been the abode of silence and tranquillity was now changed to that of noise, clamour, and confusion; but after a time order gradually prevailed everywhere. As the woods were opened and the ground cleared, the various encampments were extended, and all wore the appearance of regularity."

It is not my purpose to go at any length into the political and civil history of the colony. As far as I have opportunity of speaking of its progress, I must speak of its progress in wealth;—politically it was, at the commencement and long afterwards, nothing else than the scene of a military despotism.

Materially and commercially it was entirely dependant on the mother-country for supplies; and, were I to detail the many occasions on which the whole population, from the governor downwards, were brought to the very verge of starvation, while the recital would be painful to listen to, it would raise the reader's wonder how, from such a beginning, such results as we now witness should have ensued in so brief a period of time.

Four months after the first settlement of the colony—that is, in May 1788—the governor directed every person in the settlement to make a return of what live stock was in his possession. The following appeared to be the total amount:—1 horse, 3 mares, 3 colts, 2 bulls, 5 cows, 29 sheep, 19 goats, 49 hogs, 29 pigs, 5 rabbits, 18 turkeys, 29 geese, 35 ducks, 122 fowls, and 89 chickens. And of this small number, which was to furnish the only supply of fresh meat that could be looked for by a population of more than a thousand people, the two bulls, and four of the five cows, were lost early in the following month, owing to the carelessness of the man who had charge of them. Eventually, however, though at the cost of much suffering in the interim, the temporary loss proved a great and permanent gain.

In the month of November of this, the first year of the colony's history, a settlement was made about

fifteen miles from Sydney, at the head of the Parramatta river, which flows into, and is navigable from, the harbour of Port Jackson; and in the summer of the following year Governor Phillip, in person, discovered the river Hawksbury, which, though in many places narrow, and shut in by lofty and precipitous hills, is navigable for ships of considerable burden for upwards of 100 miles from the sea, and whose banks, where the hills do not obtrude their rocky surface, afford some of the richest soil in that part of New South Wales.

At the close of the year 1792, Governor Phillip resigned his command, and returned to England. At that time the whole land under cultivation amounted to about 1,400 acres, of which about 1,000 was public land, farmed by the Government, and the remaining 400 by various settlers, whose numbers amounted to sixty-seven; and in June following—that is, when the settlement was five years old—the stock of cattle amounted only to three bulls, twenty-eight cows, and five calves; for, of fifteen bulls purchased at various times for importation, twelve had been lost on the passage; and of 119 cows purchased, no fewer than ninety-one had been lost in the same manner.

From the period of Governor Phillip's retirement, until the arrival of his successor, Governor Hunter, in September, 1795, the settlement remained under the supervision of Major Commandant Grose. Of this interregnum I have no remark of interest to make. But, in introducing the name of Captain Hunter, I cannot forbear doing him that justice which not one, I believe, of the many who have professed

to write the history of New South Wales have done him. Captain Hunter went out in the first fleet with Captain Phillip, in command of the *Sirius* frigate, and, shortly after the settlement was formed at Port Jackson, was dispatched to the Cape of Good Hope for supplies. On his return thence to Port Jackson, he, of course, rounded the southern point of Van Dieman's Land, and steered along the eastern coast of New South Wales. In 1793 he published an account of the voyages of the *Sirius* from 1787 to 1792, when he returned in that vessel to England; and, in speaking of this voyage in 1789, from the Cape to Port Jackson, he makes the following very interesting remark:—

“In passing (at a distance from the coast) between the islands of Schooten and Furneaux and Point Hicks—the former being the northernmost of Captain Furneaux's observations here, and the latter the southernmost part which Captain Cook saw when he sailed along the coast—there has been no land seen, and from our having felt an easterly set of current, when the wind was from that quarter (north-west), we had an uncommon large sea, there is reason to believe that there is in that space either a very deep gulf or a strait, which may separate Van Dieman's land from New Holland; there have no discoveries been made on the western side of this land in the parallel I allude to, between the 39th deg. north and 42nd deg. south, the land there never having been seen.”

This supposed strait was subsequently discovered by the joint exertions of Messrs. Bass and Flinders; the latter of whom has left a detailed account of the



enterprise, and the danger and difficulties that had to be gone through before the discovery was finally effected. Bass's Strait, for so it is called, now forms the great highway from this country to New South Wales and between the colonies of Adelaide and Victoria and Port Jackson. So that the discovery itself, while it is the most interesting in its particulars, is also the most important in its results of any that have been made since the time of Cook. Captain Hunter had formed the opinion that Van Dieman's Land was separated from the mainland of Australia as early as the year 1789. He had published that opinion in 1793. In 1795, he went out as governor of the infant colony, and with him went out Flinders as midshipman, and Bass as surgeon. It surely is impossible to do otherwise than conclude that they must have seen Captain Hunter's publication ; it cannot be doubted that Hunter still cherished the opinion he had deliberately published, and still, less can be doubted, that he conversed with his officers on a subject of so much interest, and that, as a consequence, Bass and Flinders were induced, upon his authority, to attempt the discovery they finally effected. This view of the case becomes the more probable when it is added that Hunter, as governor, furnished them with the means of prosecuting their discovery successfully.

And yet Flinders in his history nowhere makes the slightest allusion to Captain Hunter's published opinion. It is not my wish to detract from the merit of Captain Flinders ; yet it is due to Captain Hunter to give him also the credit to which he is entitled ; and that the more especially because, as I have men-

tioned, I believe no other writer on Australia has noticed his share in this great discovery, which I will venture to say is that of having been its originator.

We will now proceed to make a hasty review of the adventures of Bass and Flinders. On arriving in Port Jackson in September, 1795, they found that the investigation of the coast had not been greatly extended beyond the harbours of Broken Bay on the north and Botany Bay on the south. Jarvis Bay, indicated but not named by Captain Cook, had been entered by Lieutenant Richard Bowen; and to the north, Port Stephens had lately been examined by Mr. Grimes, land surveyor to the colony, and by Captain Broughton of her Majesty's ship *Providence*; but the intermediate portions of coast, both to the north and south, were very little further known than from Captain Cook's general chart; and none of the more distant openings, marked but not explored by that celebrated navigator, had been seen.

Eager alike for adventure and discovery, and utterly regardless of danger, Bass and Flinders, accompanied by a boy, started from Port Jackson in a little boat eight feet long, called the *Tom Thumb*.

On this occasion they merely entered the harbour of Botany Bay, and traced the George's river, which is one of two that fall into that bay, about twenty miles from its mouth. Their report was followed by the establishment of a new branch of the colony on that river, under the name of Bank's Town. In the following March, the two adventurous voyagers again set sail in the *Tom Thumb*, and having been drifted several leagues further to the southward, were at one time washed on shore by the surf; and again, when

they wanted to seek shelter on the land, were forced to spend two nights at sea, on board their little boat.

At length two natives offered to pilot them to a river, which they said lay a few miles further southward, and where they could not only get a supply of fresh water, but also of fish and wild ducks. After rowing a mile up this stream, they found themselves surrounded by natives, who had the character at Port Jackson of being very ferocious, if not cannibals. To add to their difficulties, their powder was all wet; but still the youths' courage did not fail them. When they got further up the coast, they clipped the hair and beards of the two natives who had lately accompanied them up the river, and these showed themselves to the others and persuaded them to follow their example. So while Bass was drying the powder, "I," says Flinders, "began with a large pair of scissors to execute my new office upon the eldest of four or five chins presented to me; and as great nicety was not required, the shaving of a dozen of them did not occupy me long. Some of the more timid were alarmed at a formidable instrument coming so near to their noses, and would be scarcely persuaded by their shaven friends to allow the operation to be finished. But when their chins were held up a second time, their fear of the instrument, the wild stare of their eyes, and the smile which they forced, formed a compound upon their rough savage countenances not unworthy the pencil of a Hogarth. I was almost tempted," he adds, "to try what effect a little snip would produce; but our situation was too critical to admit of such experiments." At length they contrived to escape from their perilous position;

and after another night spent at sea, were glad to make their bed on the lonely sands of a neighbouring island; and on the 2nd of April reached Port Jackson in safety.

Again, in December of the same year, 1797, Bass, unaccompanied by Flinders, who was otherwise employed, set out in a whale-boat, with a crew of six seamen; and on this occasion absolutely entered the strait that now bears his name, and penetrated as far as Western Point, though, as he did not sail round Van Dieman's Land, he did not yet ascertain the existence of the strait which he was endeavouring to discover.

At length, in September, 1798, Governor Hunter entrusted Mr. Flinders with the small sloop *Reliance* of twenty-five tons, and directed him to set the question at rest, as to whether there was a practicable channel between the main land and Van Dieman's Land. In this expedition Bass was associated with him, and had the happiness, after a perilous voyage of three months' duration, of earning the reward of all the dangers he had encountered, by sailing entirely round Van Dieman's Land, and having his own name immortalised in connection with that discovery.

To relieve the dryness of the preceding details I may here mention an amusing incident that occurred during this last voyage. It will serve at the same time to illustrate the native politeness of a savage and the common proverb "*de gustibus non est disputandum.*" On occasion of our voyagers landing to examine the country, and take a survey of Twofold Bay, where is now a thriving settlement, a native

man emerged from a wood. He was of middle age, unarmed, except with a whaddie or wooden scimitar, and approached the exploring party with careless confidence. The visitors made much of him, and gave him some biscuit; and he in return presented them with a piece of gristly fat, probably that of whale. This Flinders tasted; but, waiting an opportunity to spit it out, when his swarthy friend should not be looking, he perceived him doing precisely the same thing, and with as much cautious delicacy, with the biscuit.

I shall conclude my account of the successive coast discoveries of Australia by adding, that, in the year 1801, Flinders was sent out in the ship the *Investigator* to complete the coast discovery of that vast country, and that in that and the two succeeding years he sailed round the whole coast, beginning at Cape Leeuwin and proceeding thence eastward through Bass's Strait, on his way discovering the gulf in which the town of Adelaide is now built, and the harbour of Port Philip. Subsequently to the discoveries of Flinders, a much more accurate knowledge of the various parts of the coast has been furnished by Captains King, Wickham, Grey, Stokes, Stanley, and others; but it may be sufficient to mention their names as authorities for reference, and having done so, I now proceed to take a rapid review of the internal discoveries, and of the general progress of the colony of New South Wales.

I have already mentioned the almost total loss of the stock of cattle that occurred within a few months after the first settlement of the colony. I have also observed that up to the time of the retirement of

Governor Philip, the various attempts to import an adequate supply of cattle had failed, in consequence of the great mortality on ship board. Nature, however, and the instinct of the strayed cattle, had, during these years, been laying up an ample store for the future.

In November, 1795, rumours reached the government that the cattle lost in 1788 were still in existence. The governor, having first satisfied himself that there was good ground for the rumour, determined to go in person, and, if he found any cattle at all, ascertain whether they were the original breed imported from the Cape of Good Hope, or were indigenous to the country. After travelling two days from Paramatta he crossed the river Nepean, and to his surprise and satisfaction fell in with a very fine herd of cattle, upwards of forty in number, grazing on a pleasant and apparently fertile pasturage. The day being far advanced when he first saw them, he rested in the neighbourhood for the night, hoping in the morning to get sight of the whole herd. In order to determine the breed, the governor's attendants were directed to endeavour in the morning to kill a calf. But this they were unable to effect, for while lying in wait for the whole herd to pass (which now consisted of upwards of sixty, young and old), they were furiously attacked by a bull, which brought up the rear, and which they were compelled to kill in their own defence. This, however, answered the purpose better than a calf might have done, for the bull had all the marks of the missing cattle when full grown, such as wide-spreading horns, a rising or hump between the shoulders, and a short thin tail.

The country where they were found grazing was remarkably pleasant to the eye ; everywhere the foot trod on thick and luxuriant grass, the trees were thinly scattered and free from underwood ; several beautiful flats presented large ponds, covered with ducks and the black swan, and the margins of which were fringed with shrubs of the most delightful tints, and the ground rose from these levels into hills of easy ascent. Still a very small portion of the interior was as yet discovered. A return made in the year 1798 shows 6,270 acres in crop with wheat or maize, almost entirely on the banks of the Hawkesbury river, and within a distance of from thirty to forty miles from Sydney.

These cattle were found across the Nepean, now at that part called the Cowpasture River, a narrow river that flows into the Hawkesbury. And it was not until many years later that this beautiful and fertile district was settled and brought into cultivation. This was done partially by Mr. M'Arthur, an officer in the New South Wales corps, to whom the colony is indebted for its first great step towards material prosperity.

As early as the year 1793, Mr. M'Arthur, observing the improvement produced by the climate of New South Wales in the texture of the hairy Indian sheep, purchased eight fine-woolled sheep, which had been sent out by the Dutch government to the Cape, and re-exported to Sydney. His attempts at sheep-farming, however, were only ridiculed by his brother officers ; but in 1803, having some complaints to make against the colonial government, which was then in charge of Captain King,

who had succeeded Governor Hunter, he visited England, and when there, not only obtained permission to purchase a few pure Spanish merinos from the flocks of King George the Third, but obtained an order for a grant of 10,000 acres of land to enable him to carry out his project of making wool the staple growth of the country. He selected the banks of the Cowpasture River as the spot where his grant should be made—a locality on which the town of Camden, and adjoining it the seat of Mr. M'Arthur's family, are now situated.

It is said that Mr. M'Arthur was in some doubt as to where he should select his grant. The banks of the Hawksbury present a deeper and richer soil, and a more abundant and an unfailing supply of water ; but his wife's shrewdness (she was a Scotchwoman) settled his doubts, "*Let the kye choose,*" was her advice ; and a very good choice they had made. Still there was but little prospect of carrying the breeding of sheep to any considerable extent, until the mountain ranges that shut in the strip of land bordering the coast at a distance of from thirty to sixty miles were passed ; and pasturage found for the increase of the flocks. Various attempts had been made to effect this passage by early colonists, among others by Bass, but in vain. During the unfortunate administration of Governor Bligh, who succeeded King, little was done to further any plans of improvement.

But the genial influence of Governor Macquarie's rule, who succeeded Bligh, and retained the government for the long period of twelve years—from 1809 to 1821—gave an impetus to the colony which raised



it, from a noisome dungeon to the happy land of an industrious and thriving people. Of him, Mr. Samuel Sydney, in his work on Australia, says: "He found New South Wales a gaol, and he left it a colony; he found Sydney a village, and he left it a city; he found a population of idle prisoners, paupers, and paid officials, and he left it a large free community, thriving on the produce of flocks and the labour of convicts." During his government, that is in the year 1813, three settlers named Wentworth, Lawson, and Blastane, discovered a route across the mountain ranges, and beyond them the extensive pastures of the Bathurst Plains. Within fifteen months after this discovery, the governor caused a practicable road to be made over the mountains, and soon the once still and desert plains were enlivened with the lowing of herds and the bleating of flocks. And here, too, or within a few miles (if I may anticipate events of our own time), were hidden the first discovered mineral treasures, which now produce a revenue far exceeding in value even the thousands of herds and flocks that cover this vast territory.

When once an impetus had been given to discovery, other districts were necessarily found and opened. Between the years 1813 and 1819 the rivers Macquarie, Lachlan, and Munanbridge were discovered, and their sources traced by Mr. Oxly, the Surveyor-General. And during the succeeding administration of Governor Brisbane, Captain Currie explored the Maniwo plains, situated between two and three thousand feet above the level of the sea, and separated from Twofold Bay by a lofty range of mountains. In the same year Oxly explored Moreton Bay to the north;

and discovered the navigable river Brisbane; and in the following year, 1824, two enterprising settlers, Messrs. Hume and Howell, accomplished an overland journey from Sydney to Port Philip, a distance of 600 miles, through dense and trackless forests. Again, in 1825, Mr. Allen Cunningham discovered Pandora's Pass, a narrow cleft that affords the only practicable road from the Upper Hunter to the pastoral uplands of Liverpool Plains.

In 1829 Captain Sturt traced the upper course of the river Darling, and in the following year explored the lower portion of the river Murray, which he pursued to its termination, in the shallow expanse of Lake Alexandrina, in the colony of Adelaide. It is only within these two years that that intrepid seaman, Mr. Cadell, has succeeded in navigating this river by steam, and has established a regular line of boats, which, unless railroads are speedily formed between the upper parts of that river and Sydney, threaten to draw to Adelaide the chief wool of the interior of the colonies of New South Wales and Victoria, and consequently the trade of those districts.

My space will not permit me to do more than notice the names of Sir Thomas Mitchell, Mr. Eyre, Mr. Kennedy, and Dr. Liechard, as filling up the list of explorers in these vast regions; and of whom the last two have lost their lives in the cause. Still, with all that has been done, little more than a belt of land on the southern and eastern sides of this great continent has been adequately explored.

The greater part of the interior, and of the northern and western coasts, with the exception of the insig-

nificant settlement at Swan River, is as yet a blank upon our maps, and is as unknown as if the country had never been visited by civilised man.

Before concluding this chapter, I will give a few returns of the export of wool at various periods, as affording a significant illustration of the rapid rise of Australia from a state of poverty and depression to wealth and prosperity. In 1819 the quantity of wool shipped from New South Wales amounted to 71,299 lbs., in 1825 to 411,600 lbs., in 1830 Australia, including Van Dieman's Land, sent home about 1,968,000 lbs.; in 1835, 4,210,000 lbs.; 1840, 9,721,000 lbs.; 1845, 24,177,000 lbs.; and in 1850, 39,000,000 lbs.

Unexampled in the history of the world, however, as is this instance of progressive prosperity, yet as I shall have an opportunity of showing, in a subsequent chapter, the exports of wool, though still as great as ever, now form but a small, indeed an insignificant, portion of the wealth of Australia; a colony which, though it is hoped it will still cherish its growth of wool, is fast becoming one of the greatest countries in the world for the supply of mineral treasures, as well those which are useful as those which are distinguished by the name of precious.

## CHAPTER II.

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### A REVIEW OF THE ANCIENT AND MODERN GOLD MINES.

The Author's purpose is not with Australia alone but with GOLD—Uses of gold amongst the ancients—Notices in Holy Writ—In Homer—Gold the peculiar property of kings, and the fitting ornament of fabled deities—Glaucus and Diomedes—Euripides—The working of gold of a rude fashion at this time, witness Homer's description of the arms of Achilles—Arrived at perfection probably about the time of Phidias—The celebrated statues of Minerva at Athens and of Jupiter at Olympia—Scarcity of gold amongst the early Romans, who never attained much perfection in the working of this metal—Gold amongst the Asiatics—Midas—Croesus—Sources of ancient gold—The Spanish conquests in America—Cruel exactions from the natives—The mining expedition of Pello Belois—Story of Miguel Diez—Gold mania amongst the Spaniards—Discoveries of Peru by Balboa and his companions—Pizarro—Cruelties perpetrated by Pizarro upon the Inca of Peru, and the vast quantities of gold obtained by these means.

IN the preceding chapter I drew a rapid and hasty sketch of the discoveries in Australia, as well those on the coast line as in the interior; I also traced the rise and progress of the colony of New South Wales, from its first settlement as a distant convict establishment to its more prosperous though still humble condition of a thriving pastoral, agricultural, and commercial state. Were it my object to dwell only on the fortunes of Australia, I might at once proceed to

the discovery of gold in that country, and having given its history, might proceed to enlarge on the wonderful results which have already followed upon that discovery. But my subject is not Australia alone, but GOLD; and all that has to do with gold at whatever period of the world's history cannot fail to be of interest to me. I trust, too, that the subject I now propose to enter upon will not be without its interest to my readers. I propose, then, to give some account of the uses of gold among the ancients, and of the gold mines discovered at various periods, from the earliest times down to the commencement of the present century. In collecting the materials for this branch of my subject, I have to express my obligations to a gentleman of my acquaintance in Australia, one of the few there who, preferring intellectual to material wealth, has kindly furnished me with extracts and translations from various ancient authors, and has directed my attention to a variety of sources of information which I should not have been otherwise aware of. In the development, then, of this part of my subject, it is my intention to commence by referring to some of the chief and earliest notices of the uses to which gold was applied by the ancients, especially among the Greeks and Romans, inasmuch as their accounts are the most full; and having then gone over the chief sources whence this metal was in those days procured, I shall reserve for a subsequent chapter what relates to the methods of procuring the precious ore from the soil, employed at various periods.

Much interesting information touching the history and uses of gold is found in Holy Writ:—Witness

the mention therein made of the good gold in the land of Havilah, of the gold of Parvaim, of Sheba and Ophir,—again of the golden chains; of the candlesticks, the censers, and numberless other ornaments or implements in which that metal was employed by the Hebrews of old; but it may be sufficient to make only passing mention of a source of information which must already be well known to most of my readers.

I proceed, therefore, at once to glean what I can from that branch of literature which has received the peculiar title of "*ancient*," though in fact less ancient than much of the Hebrew or Jewish records. Nor must it be thought strange that I speak of the uses to which gold was applied before enquiring into the sources whence, and the means by which, it was obtained; for herein I do but follow the natural course of human affairs—it being probable with respect to gold, as with most other articles of commerce, that it would be long in daily use before the notion of inquiring into its history would be thought of.

The earliest heathen writer whose works have reached our times in any except a fragmentary form is Homer; or at any rate the writer of the Homeric poems, as many are pleased to designate them; and from which writings alone a painstaking reader and critic, by linking together and classifying the notices of gold therein to be met with, might doubtless compile a moderately-sized treatise of much interest. But I must content myself with referring only to a few passages in those works, just sufficient to illustrate, not to exhaust, the subject in hand.

Homer is supposed to have flourished about 1,000

years before the Christian era, and wrote or sang of transactions which, as far as they are historical and not fabulous or mythological, occurred about 200 years before his day. The country as well as the period in which he lived is worthy of notice. He was a Greek of Asia Minor—of that part of the world in which, as far as history guides us, gold was most abundant. Even 500 years after his time almost all the gold that found its way into Greece was supposed to have come from Asia, except what was produced from some small islands in the Mediterranean, and from one not very considerable mine in Thrace, of which I shall have occasion to speak presently. It should be added that even the people of the latter district were connected in alliance with the people of Asia Minor, rather than with those of Greece.

The place of Homer's habitation is important, because we must suppose that had the customs of the Asiatics, as far as he knew, differed very materially from those of the Greeks proper, we should find traces of the difference in his writings. For instance, we *know* that the Greeks had no gold coinage in Homer's time, and that had there been such a coinage in Asia Minor, he could hardly have failed to have mentioned it, considering that gold in several forms is spoken of by him in some hundreds of passages, and not only so, but is particularly mentioned as constituting the wealth of different princes or chiefs. I think it fair, therefore, to infer from his silence that *no* gold coin *then* existed, though a later writer tells us that this metal was first coined in that very country.

Still, though not used as money in our sense of the

word—that is, as the measure of value—it was then the chief element of riches, and bore of all things the highest value. Nay, so precious was it, that it was almost the peculiar property of kings, or the fitting ornament of the poet's fabled deities. Thus Apollo is represented as having “a sword with a golden scabbard.” Mars, whom another poet describes as “the god with the golden helmet,” in Homer has his war-horses ornamented with a golden fillet or head-dress. Again, Diana has golden reins and arrows of gold; and, as if to imply that the use of a substance so precious was more suited to gods than even to kings, while the sceptre-bearing chief of the Grecian host, as he is called, has a sceptre only studded with gold, the priest of Apollo, though he comes as a supplicant to this same mighty chief, has—

“His hands charged with the wreath  
And golden sceptre of the god shaft-armed.”

And not only are these chiefs represented as having particular instruments made of or adorned with gold, but several of them are armed in gold; thus, Amphi-machus, leader of the Carians in Asia Minor, is described as giving way to girlish vanity at the siege of Troy.

“Like a simple girl,  
Came forth Amphi-machus with gold bedight;  
But him his trappings from a woeful death  
Saved not when whirled beneath the bloody tide  
Of Peleus' stormy sons, his spoils he left.

Again, on the meeting of the Lycian chief, Glaucus, with Diomedes, after a few words of parley, which commonly preceded the single combat of the ancient heroes, they mutually discover that there had for-



merly existed a friendship between their two families; whereupon they not only forbear from the intended conflict, but change their armour on the spot, Glaucus giving gold for brass. The proposal comes from the brass-clad hero, and the poet commemorates the infatuation of Glaucus in making so unequal an exchange:—

“ But it were well,” says Diomedes—

“That an exchange ensued  
Between us ; take mine armour, give me thine,  
That all who notice us may understand  
Our patrimonial amity and love,  
So they, and each alighting, hand in hand  
Stood locked, faith promising and firm accord.  
Then Jove of sober judgment so bereft  
Infatuate Glaucus, that with Tydeus' son  
He bartered gold for brass, an hundred beeves  
In value for the value small of nine.”

One other instance must be mentioned, because however fabulous we may consider the Homeric poems to be, we shall find in them much historical truth intermingled with the fable, of which the case about to be adduced is a remarkable illustration. The tenth book of the Iliad describes the two armies as resting at night after the fatigues of the preceding day's battle, in which the Greeks had been very severely handled. The chiefs, however, are anxious and on the alert ; Hector, thinking that the Greeks will probably be forming plans of escape from the shores of Ilium, sends out Dolon as a spy to discover what is passing in the Grecian camp, whilst on the other hand the two Grecian chiefs, Diomedes and Ulysses, set out on a similar errand to the Trojan camp. On their way they intercept the Trojan spy Dolon, and compel him to give them

information respecting the position of the hostile army. Amongst other things he tells them that Rhesus, a Thracian prince, had that day arrived in the Trojan camp with reinforcements. He says :—

“ For if you wish to penetrate the host,  
 These who possess the borders of the camp,  
 Farthest removed of all, are Thracian princes,  
 Newly arrived ; among them Rhesus sleeps,  
 Son of Eioneus, their chief and king ;  
 His steeds I saw, the fairest by these eyes  
 Ever beheld, and loftiest ; snow itself  
 They pass in whiteness, and in speed the winds.  
 With gold and silver all his chariot burns,  
 And he arrived in golden armour clad  
 Stupendous ! little suited to the state  
 Of mortal man—fit for a god to wear.”

The two chiefs mentioned before as having had golden armour, both belonged to gold-bearing countries, Caria and Lycia in Asia Minor. Rhesus was a European, but then he was a Thracian prince, a prince of that very part of Europe which possessed almost the only gold mine then known in the continent of Europe.

So the tragic poet Euripides, who lived upwards of 600 years after Homer, in his tragedy of Rhesus, makes one of the Muses, who was the fabled mother of this very Rhesus, describe herself as passing through the river Strymon in Thrace, the very place where the gold mine was, and as coming to the golden-grained sand of Pangæus, where, as I shall have occasion to notice presently, gold mines were worked in the time of Euripides.

Instances, such as those above given, might be multiplied without end from Homer and the poets of several successive centuries ; but at this point a question of some interest presents itself—what was

the state of the art of working in gold at this period ; was it still rude, or had it reached that state of perfection which even a Benvenuto Cellini has, in later days, failed to rival ? I think that from one passage in Homer, the last I shall quote, we may infer that the art was in its rudest state. I refer to the well-known arms of Achilles, sung of in the eighteenth book of the Iliad, as being forged by Vulcan. We cannot doubt, that if one of their deities was to be portrayed in the character of a practical mechanic, he would at least have been perfect in his art as far as his art had attained to perfection. Whatever was known must be known by him, indeed all mere human artists would have learned from him. Yet, if we take but a few lines descriptive of the manufacture of the shield, we shall see that the workmanship must have been of the rudest kind :—

“ He said, and to his bellows quick repaired,  
Which turning to the fire, he bade them heave, .  
Full twenty bellows, working all at once,  
Breathed on the furnace, blowing easy and free  
The managed winds, now forcible, as best  
Suited dispatch, now gentle, if the will  
Of Vulcan and his labour so required.  
Impenetrable brass, tin, silver, and gold  
He cast into the forge, then settling firm  
His ponderous anvil on the block, one hand  
With his huge hammer filled, one with the tongs,  
He fashioned first a shield massy and broad,  
Of labour exquisite, for which he formed  
A triple border, beauteous, dazzling, bright,  
And looped it with a silver brace behind.  
The shield itself with five strong folds he forged,  
And with devices multiform the disc  
Capacious charged, toiling with skill divine.”

Nor for several centuries is it possible, I believe, to trace any improvement in the art of working in gold. It seems, as it naturally would do, to have

been brought to its highest perfection when those works of statuary and sculpture, whose remains still form the wonder and admiration of civilised men, the works of Phidias and his followers, were produced—that is, in the fifth century before our era. No doubt in the interval, with the increase of commerce and intercourse with Asia and Greece, an increase in the introduction of Eastern luxuries into Europe had taken place, and gold, a century at least before the time of Phidias, had become no longer the exclusive adornment of gods and kings, but was employed as an article of luxury in implements or utensils of domestic use. Thus the great lyric poet, Pindar, compares his own composition of an ode in honour of a victor in the Olympic games, with the act of a father of a bride pledging the bridegroom from a golden drinking-cup, and then handing it over to him first, and afterwards to the assembled company. The passage may be worth quoting, as it not only illustrates the subject in hand, but affords a very ancient instance of two customs still prevalent amongst ourselves, one, that of drinking healths; the other, that of passing round the loving-cup, as it is sometimes called. Thus, then, the ode opens:—

“ Like a chalice all of gold,  
With the vine dew bubbling o’er,  
That one at wedding feast doth hold,  
Costliest treasure of his store.  
First quaff to him, above the rest,  
Whom his daughter’s love has blessed  
From home to home, then gives to bear  
The envied present, rich and rare.  
So I, the Muses’ nectar shedding,  
To conquerors deal the draught divine,  
Whose brow with garlands amply spreading  
Pytho and Olympia twine.”

We now approach that period of Grecian history when the invasion of Greece by the Persians, accompanied by a corresponding increase of commerce, brought large quantities of the precious metal from Asia into Europe. Still, no gold was coined in Greece—that metal was only used in works of art; but the amazing quantity that was so employed, almost surpasses belief. Two instances, while they illustrate the subject generally, will give some notion of the stupendous works of art of these periods, and which succeeding ages have never attempted to rival. The last invasion of Greece, under Xerxes, took place 480 years before the Christian era. At that time the great sculptor, Phidias, was living; he died about forty-eight years afterwards, that is, 432 years before our era. In 430, or two years later, the Peloponnesian war began, and we learn from the historian of that war, who was himself employed in it, and also tells us that he himself was owner of the gold mine in Thrace beforementioned, that at this time there was no gold in the Athenian treasury; there was, indeed, abundance in the possession of private persons, and in the temples of their gods—but still it was not yet used as money. It was during the interval of fifty years, between the date of the Persian invasion and the Peloponnesian war, that the two statues, of which I am about to give some account, were made.

The first was a colossal ivory and gold statue of Minerva, which was placed in the Parthenon at Athens. Before the time of Phidias, such statues were either made of bronze or of marble and wood; the body, which was concealed by real drapery, being

formed of wood, and the extremities, as the head, hands, and feet, which were exposed, being of marble. Phidias substituted the more delicate and costly material of ivory for marble, and solid gold for real drapery. The height of the statue referred to, including the base, was twenty-six cubits, or about thirty-nine feet of our measure. It represented the goddess standing, clothed with a tunic that reached to the ancles; she held a spear in her left hand, and an image of Victory, four cubits high, in her right. She was girded with the ægis, that is, the goat's skin with which Jupiter and Minerva are commonly adorned; and she had a helmet on her head. Her shield rested on the ground by her side. Each portion of the statue seems to have been most elaborately ornamented. A sphinx formed the crest of the helmet, and on each side of it were gryphons, all of solid gold. The ægis was fringed with golden serpents, and in its centre was a golden head of Medusa. Even the edges of the sandals, which were about three inches in breadth, were engraved with views of the battle of the Lapithæ and the Centaurs. The shield was ornamented on both sides with embossed work representing, on the inner side, the battle of the Giants against the Gods, and on the outer, the battle of the Amazons against the Athenians. But I need not go into further details; enough has been cited to give a fair notion of the elaborate character of this work, and of the profusion of gold with which it was adorned. The latter will be best proved by the mention of the weight and value of the statue. Its weight is given us by several ancient authors, and though they do not precisely agree, yet we may

safely take, as a medium between the various statements, forty-four Attic talents as the weight of this statue, or 3,960 pounds troy ; and valuing gold at £40 per pound in money, the worth of the gold in this single statue would appear to be the prodigious sum of £158,400.

The other statue to which I allude, and which was also of ivory and gold, was one of Jupiter, and was placed in his temple at Olympia, in the Peloponnesus. It was larger than the preceding one, being upwards of fifty feet in height, though the figure was placed in a sitting position, which would of course occasion the limbs to be proportionately larger. The god was represented as seated on a throne of cedar wood, adorned with gold, ivory, ebony, stones, and colours ; crowned with a wreath of olive, holding in his right hand an ivory and gold statue of Victory, with a fillet in her hand and a crown upon her head ; and in his left, supporting a sceptre, which was ornamented by all sorts of metals, and surmounted by an eagle. The robe, which covered the lower part of the figure, and the sandals, were of gold ; the former, as we are expressly told, of beaten gold. The throne was brilliant with gold and stones, and with ebony and ivory, and was ornamented with figures both painted and sculptured. Against each leg of the throne were four figures of Victory, in the attitude of dancing, and two others at the foot of each leg. The top of the throne, above the head of the figure, was surmounted on one side by the three Graces, and on the other by the three Hours, who were introduced as being the daughters of Jupiter and the keepers of heaven. The footstool of the god was supported by four golden

lions ; and the sides of the base, which supported the throne and the whole statue, were ornamented with sculptures, in gold, representing the Sun mounting his chariot, Jupiter and Juno, Love receiving Venus as she rises from the sea, Pitho crowning her. Here, also, were introduced Apollo and Diana, Minerva and Hercules, Amphitrite and Neptune, with Selene riding on a horse or mule. Such is an epitome of the account left us by one who saw the statue in existence. We have no account, as in the case of the other colossal statue, of the weight of gold in it, but we may form some notion of it from the statement of an ancient author, who informs us that each lock of the hair weighed six *minæ*, that is to say, 9lbs. troy.

Turning from the Greeks to the Romans, we find a remarkable contrast between the two people in respect of this article of luxury and refinement. For several centuries after the building of Rome, scarcely any mention is made of the use or possession of gold by that people. Pliny, who wrote expressly on the subject of gold, and whose description of the ancient method of procuring gold from the mines, will be given in a subsequent chapter, tells us that, in the time of the elder Tarquin, it was customary to hang amulets of gold round the necks of youths of the highest rank, which they continued to wear until the age of seventeen ; and that kings and ambassadors, sent out to foreign nations, were provided, at the public charge, with golden rings. But here the practice ends ; even the senators, he says, did not wear them. The date he speaks of is somewhat more than 600 years before the Christian era, a period when, as has been observed, Greece was beginning to abound in gold.



This scarcity continued to exist for upwards of two centuries later ; for in the year 390 A.C., when their city was taken by the Gauls, the Romans were only able to produce one hundred weight for the redemption of their city, though Pliny says that there was then in the city two hundred weight, including the gold in the temples. This ransom, though large for the Romans to pay, was inconsiderable for their conquerors to receive, for the Gauls had gold sands of their own, and used it (like the Greeks) for personal ornament. Thus we read, that in the year 361 A.C., Manlius, a Roman, earned immortal renown by slaying in single combat a gigantic Gaul, who, like Goliath of old, had stepped out of the ranks and challenged any Roman to fight him. From the dead body of the Gaul he took a chain of gold, with which he was adorned, and placed it round his own neck. His comrades, in their rude songs, gave him the name of Torquatus, from the Latin word *torquis*, which signifies a chain ; and this name he and a long line of descendants thenceforth continued to bear. So rare a piece of good fortune was it for a Roman in those days to win a golden chain.

From this period, owing probably to their intercourse with the Greeks, and still more from their subsequent conquests in Spain, a country abounding in gold, and whose mines were worked on regular mining principles, the Romans began to amass large quantities of that metal. Pliny remarks, that the man who first introduced the fashion of wearing gold rings on the fingers, whose name, however, he could not discover, was the occasion of the most pestilent mischief, owing, of course, to the effeminacy and luxury it occasioned. Rings of gold, he tells us, became more

common in process of time : at first they were worn on the finger nearest the little one, as seen on some of their ancient statues, then on the forefinger, and at last also on the little finger ; and to such an extent had this custom increased that, at the battle of Cannæ, in the year 216 before the Christian era, in which battle the Romans suffered immense loss, it is related that three bushels of gold rings (according to one authority, but only one bushel according to another) were taken from the bodies of the slain, from whence, when it is borne in mind that only *equites* or knights, that is persons of a certain amount of wealth which qualified them for the higher ranks in the army, were allowed to wear gold rings, it is evident that the total amount of slain must have been prodigious. At no time, however, did the ancient Romans possess any great amount of gold, or carry the art of working that metal to any considerable extent. When, at a later period, the Roman emperors and other possessors of wealth indulged in the utmost splendour, their ambition was rather to purchase the old chased or embossed utensils of the Greeks than to encourage among their own people a taste for the higher branches of art.

Of the Asiatics I have scarcely spoken as yet, though they doubtless possessed large quantities of gold long before it was found among the Greeks ; but as I mentioned before, our accounts of gold as in use among the Greeks go farther back, and, moreover, are more connected than those relating to the Asiatics. It will be proper, however, to say something of these latter ;—first, of their possessions in gold, and then of the introduction of a gold coinage. We all have

heard of the fabled wealth of Midas, King of Phrygia, who, for some service done to the god Bacchus, is said to have been promised the fulfilment of any wish he might express. He desired that everything he touched should be turned into gold. His request was granted, but as the promise was fulfilled so literally that even the food which he touched was turned into gold, he was soon fain to implore the god to take his boon back again. The legend goes on to say that Bacchus directed him to bathe in the source of the river Pactolus, near Mount Tmolus, in Lydia; the prescription answered its end, and from that time forward the sands produced abundance of gold. These ancient fables generally have some foundation in truth, and I think that in this instance we may fairly conclude Midas to have been the fortunate possessor of the gold diggings, which, though exhausted now, were once so famed for their riches; and that so, figuratively speaking, all he touched was turned into gold. Of the extent, however, of his riches we have no account.

The name of another king of that same country, Lydia, has come down to us as proverbial for excess of wealth, and of a portion of his treasures we have an account so particular, so unquestionably true, that we may form some notion of what the entire amount must have been. Cræsus, when about to make war on the Persians, sent, as was the custom of the time, to consult the oracle at Delphi as to his success, at the same time endeavouring to propitiate the god by magnificent sacrifices and presents. I give this story as related by Herodotus. "He offered 3,000 head of cattle of every kind fit for sacrifice, and having heaped up a great pile, he burnt, on beds of gold and silver,

vials of gold and robes of purple and garments, hoping by that means more completely to conciliate the god ; he also ordered all the Lydians to offer to the god whatever each was able. When the sacrifice was ended, having melted down a vast quantity of gold, he cast half bricks from it, of which the longest was six palms in length, the shortest three, and in thickness one palm ; their number was 117. Four of these of pure gold weighed each two talents and a half, the other half bricks of pale gold weighed two talents each. He made also the figure of a lion of fine gold, weighing ten talents. This lion, when the temple of Delphi was burnt down, fell from the half bricks, for it had been placed on them, and it now lies in the treasury of the Corinthians, weighing six talents and a half, for three talents and a half were melted from it. Cræsus, having finished these things, sent them to Delphi, and with them these following, two large bowls, one of gold the other of silver ; that of gold was placed on the right hand, as one enters the temple, and that of silver on the left ; but these also were removed when the temple was burnt down, and the golden one, weighing eight talents and a half and twelve minæ, is placed in the treasury of Clazomenæ ; the silver one, containing 600 amphoræ, lies in the corner of the vestibule, and is used by the Delphians for mixing the wine on the Theophanian festival. The Delphians say it was the workmanship of Theoderus the Samian, and I think so too, for it appears to be uncommon work. He also sent four casks of silver, which stand in the treasury of the Corinthians ; and he dedicated two bustral vases, one of gold, the other of silver ; on the golden one is an inscription,

"*Of the Lacedæmonians*," who say that it was their offering, but wrongfully, for this was also given by Cræsus; a certain Delphian made the inscription, in order to please the Lacedæmonians; I know his name, but forbear to mention it. The boy, indeed, through whose hand the water flows, is their gift; but neither of the bustral vases. At the same time Cræsus sent many other offerings without an inscription, amongst them some round silver covers, and, moreover, the statue of a woman in gold three cubits high, which the Delphians say is the image of Cræsus' baking-woman; and to all these things he added the necklaces and girdles of his wife."\*

Now leaving the image of the baking-woman out of the question, because we are not told its weight, the weight of gold alone sent to Delphi amounted to £23,640 of our money, and this was only a present, be it remembered. Another small present that Cræsus made to Alcmaeon, an Athenian of distinguished family, was sufficient to enrich both him and his descendants. When the ambassadors of Cræsus reached Delphi, Alcmaeon assisted them in procuring a favourable answer. On their return, "Cræsus being informed by the Lydians who had gone to consult the oracle, that he had done him good service, sent for him to Sardis, and when he arrived presented him with as much gold as he could carry at once on his own person. Alcmaeon, for the purpose of making the most of such a present, had recourse to the following expedient. Having put on a large cloak, and having left a deep fold in the cloak, and having drawn on the widest boots he could find, he went into the

\* See Carey's translation of Herodotus

treasury, to which they conducted him, and meeting with a heap of gold dust, he first stuffed around his legs as much gold as the boots would contain, and then having filled the whole fold with gold, and having sprinkled gold dust over the hair of his head, and put more into his mouth, he went out of the treasury, dragging his boots with difficulty, and resembling anything rather than a man, for his mouth was stuffed and he was all over swollen. Cræsus, when he saw him, burst into laughter, and he gave him all that, and besides, presented him with other things not of less value than it. Thus this family became extremely rich, and Alcmaëon, having by these means bred horses, won the prize in the Olympic games."

Herodotus also tells us expressly that the Lydians were the first people who coined gold money, and though it would be difficult to speak with any confidence (from lack of distinct information) with respect to nations situated further to the east, and which had abundance of gold, I think it very certain that the Asiatic nations in general, and the Greeks of Asia Minor in particular, as well as of some of the adjacent islands, possessed a gold coinage long before the inhabitants of Greece Proper. But my space will not allow me to follow out this subject. The history of the gold coinage of the ancients would alone require a whole volume for its full development.

It is an interesting inquiry to consider the sources from whence the ancients procured the vast quantity of gold that they undoubtedly possessed. I believe that the most careful examination of ancient litera-

ture, would throw but very little light on the geological part of the subject ; that geology being a branch of natural philosophy but little understood in olden times. Nature, however, never changes, but continues to operate under fixed laws. Wherefore, as it appears to me, as we can now argue the existence of gold from certain known geological formations, so we may conclude, that, wherever gold was found in ancient times, the geological formations must have been similar to those with which we find it associated in our day. Though I have not had the opportunity of verifying this opinion myself, I have little doubt that such formations as I speak of are clearly to be traced by those having an opportunity of visiting the various regions where the ancient gold mines existed. At present, however, I must content myself with such particulars as I have been able to glean from the ancients themselves upon this subject.

To begin with Asia. The profusion of gold, which in all ages came from that quarter of the world, make us not scruple to believe the reports we have of the mines, streams, rivers, and even waters of gold, that abounded there. Of them all, however, the Pactolus was the most celebrated in poetry ; and the golden sands of India were most remarkable in history. Of the latter, we are told by Herodotus, that, when the first Darius ascended the throne of Persia, and was declared king of all the peoples of Asia, except the Arabians, he divided his kingdom into twenty different governments, called Satrapies. Of these, India was by far the largest, and the portion of annual tribute imposed on the people of that country, amounted to 360 talents of gold-dust ;

that is, about one million and a quarter of our money. Of the method in which this gold was obtained the historian gives a most wonderful account, which, however, I must reserve for a future chapter. This gold, we are informed, the king used to treasure up in the following manner: having melted it, he had it poured into earthen jars, and when they were filled, the earthen mould was taken away. When he wanted money, so much gold as he had occasion for was from time to time cut off;—affording another instance, it may be observed, of the non-existence of a gold coinage in early times.

In Africa, the sources of gold known to the ancients were situated on the eastern coast of that continent; that which is now called the Guinea Coast being quite unknown to them. Then, as now, the produce of gold was enormous; so great, that the historian, whom I have so often referred to, relates that the king of Ethiopia exhibited to the ambassadors of Cambyses all his prisoners bound in chains of gold. On this coast, also, further south, between the 22nd and 25th of south latitude, is supposed to have been the kingdom of the ancient Ophir, from whence Solomon obtained his gold. Then, as now, the gold in that part of the world seems to have been obtained by washing.

We now come to the gold mines of Europe, and here our information is more precise. To pass over several mines that were worked in various islands of the Mediterranean, the earliest we hear of being known on the continent of Europe were those before mentioned, as having furnished Rhesus at the Trojan war with his golden armour, and which nearly 1,000



years later, the historian of the Peloponnesian war, Thucydides, tells us, were his own property, and worked by him. These mines were situated near the river Strymon, which flows into the Strymonian Bay; the river is now called the Carason, and the bay, the Gulf of Contessa. They were formerly called "Scaptesytle," which means, "the woody country where the diggings are;" the first part of the name, *Scapte*, meaning to dig, and the latter, *hyle*, meaning wood. Of the method of working these mines we have no account, but from the frequent and familiar use of the words gold-pickers, and gold-diggings among the Greeks, it seems probable that they had recourse to washing and digging, but we have no account of their having worked gold-mines as they did those of silver.

Of the gold-producing streams of the Gauls, I need do no more than note the existence. The most interesting of all the ancient mines are those of Spain; and a contemporary writer (Pliny) gives us a most precise account of the method of working them, which will be noticed more particularly in a subsequent chapter, to be devoted to an account of the various methods of procuring gold, adopted in different countries at various times. For the present, I will only observe, that, in mentioning the sources whence gold was obtained, Pliny says, "It is found in our world by ants, among the Scythians in the sands of rivers, as the Tagus in Spain, the Po in Italy, the Hebrus in Thrace, the Pactolus in Asia, and the Ganges in India;" he adds, "it is also found in wells or mines, and in the ruins of mountains."

Passing over nearly fifteen centuries of time, we

come to the first gold discoveries in modern times, as contra-distinguished from the ancient; I mean those that followed on the discovery of America by Columbus.

As in the former part of this chapter I have confessed my obligations to a gentleman of high classic attainments, so here I may once for all state, that my chief sources of information are Robertson's "America," Washington Irving's "Life of Columbus," and Prescott's "Peru." From these I shall draw freely, without, on each occasion, mentioning my authority.

I need hardly remind the reader that the American continent and islands adjacent were utterly unknown to the inhabitants of the Old World prior to the year 1492, that is, about 360 years ago; when Columbus, setting sail from Spain in search of a western passage to India, fell in with land at about the 76th deg. of west longitude, to which he gave the name of St. Salvador. At that time the passage to the East Indies by the Cape of Good Hope was unknown, and the only means of access to that part of the world was either overland or across the Isthmus of Suez and down the Red Sea. Columbus, on discovering the islands which are now called the West Indies, believed that he had succeeded in effecting the object he had in view, and lived and died in that persuasion, though, in fact, he was about 10,000 miles distant from the nearest part of the coast of China. The signs of vast mineral wealth which presented themselves on all sides tended very much to confirm him in this belief. The natives of St. Salvador, though living in the rudest state of

uncivilised life, without clothes, without arts, without commerce, or even agriculture, yet possessed abundance of golden trinkets. The Spaniards very naturally and as eagerly inquired whence they procured it, to which the natives would only answer by pointing to the south, where dwelt a king, they said, of such wealth, that he was served in vessels of wrought gold. Columbus accordingly determined on prosecuting his discoveries further; and coming to the island of Cuba, for a long time searched in vain for the precious metal, but at length found stones streaked with veins of gold in the bed of a river, to which he gave the name of St. Catherine. Still the precious metal did not show itself in sufficient quantity to repay the labour that would be required to collect it. He next proceeded to the island of Hispaniola, now called Hayti, or St. Domingo. Here he met with gold in much greater abundance, and with ornaments of infinite variety. The native chief presented him with a mask of wood, with the eyes, ears, and various other parts of gold; he himself having plates of the same metal round his neck, and a kind of golden coronet upon his head. Nor were these riches the exclusive property of the chiefs, the natives of all classes possessed as much as they chose to take the trouble of collecting; and as it was to them an article of no value or use beyond the purposes of ornament, they readily exchanged it for any strange trifle that took their fancy. The most attractive commodity in their eyes seems to have been hawkbells; these they suspended about their persons while dancing, and took excessive delight in the music that accompanied their steps. On one

occasion, we are told, an Indian gave half a handful of gold-dust in exchange for one of these toys, and no sooner was he in possession of it than he bounded off to the woods, often looking behind him for fear the Spaniards should repent of having parted so cheaply with such an inestimable treasure. On another occasion the cacique, or chief, gave Columbus 800 beads of gold, a golden coronet, and three small calabashes filled with gold-dust (a calabash is a species of small gourd, whence the name is given to a bowl, or small vessel made of its rind), and thought himself outdone in munificence when presented with a number of glass-beads, hawkbells, knives, pins, needles, small mirrors, and ornaments of copper, which metal he seemed to prefer to gold. At length, seeing Columbus's eagerness for the precious metal, the chief told him that there was a place not far off among the mountains, where it abounded to such a degree as to be held in little value, and promised to procure him as much as he required.

These tokens of boundless wealth being taken home to Spain, inflamed the cupidity of the avaricious with the idea of regions of unappreciated treasures, where the rivers rolled over golden sands, and the mountains teemed with gems and precious metals. Accordingly, in the following year, Columbus, with a considerable reinforcement, set out in search of the reported gold mines. He had been told that in the interior of Hispaniola was a chief named Caonsho, that is, "The lord of the Golden House;" to his territory; accordingly, he proceeded, attended with a company of miners and a considerable military force; and on reaching the district of

Cibao, which was the spot to which they had been directed, the appearance of the country answered the description given of it by the natives. It was mountainous and uncultivated ; but the sands of the mountain streams glittered with particles of gold. In some places were picked up large specimens of virgin ore from the beds of the torrents, and stones streaked and richly impregnated with it ; and in one of the brooks was found a mass of rude gold weighing nine ounces. The natives had never opened any mines in search of gold. To penetrate into the bowels of the earth, and to refine the rude ore, were occupations too complicated and laborious for their talents and industry ; and they had no such high value for gold as to put their ingenuity and invention on the stretch in order to obtain it. The small quantity of the precious metal which they possessed was either picked up in the beds of the rivers, or washed from the mountains by the heavy rains that fall within the tropics. Nevertheless, from the foregoing indications, the Spaniards could no longer doubt that the country contained rich treasures, of which they hoped soon to be masters.

There were, however, circumstances which prevented the Spaniards themselves from amassing any great treasures by their own labour and exertions. In the first place, gold was an article of royal monopoly in all enterprises of discovery ; nay, even trade in it was forbidden to private persons ; so that it is not probable that the Spanish miners would apply themselves very diligently to their work, when instead of enriching themselves by the produce acquired, a third went to the Crown, and the remainder had

to be divided among the various members of the expedition according to their different ranks. Again, the softness of the climate, and the abundance of the natural productions of the earth, indisposed them to hard labour; added to which, the facility with which they could procure the precious metal to a limited extent from the natives themselves, induced them to look rather to their labours as the means of satisfying the cupidity of their superiors at home and in the camp.

The natural results followed. The oppressive exactions of the Spanish soldiery induced the native chiefs to combine for their expulsion from the island; but no number of unarmed people could be a match for the most highly-disciplined troops then known in the world; the victory of the latter was easy, and was signalised by the imposition of the first tax to which these wretched people had ever been subject. In the regions of the mines each person above the age of fourteen years was required to pay quarterly the measure of a Flemish hawksbell of gold-dust; the chiefs had to pay a much larger amount;—a hawksbell contains gold equivalent in value to about fifteen dollars of the present day—so that each native had to pay an annual tax of £12 sterling, which, though it may appear small to a gold digger of these days, yet was extremely oppressive on those simple people. Weak and indolent by nature, unused to labour of any kind, and brought up in the untasked idleness of their soft climate, and their fruitful groves, to them death itself seemed preferable to a life of toil and anxiety. They saw no end to this harassing evil which had so suddenly fallen upon

them; no escape from its all-prevailing influence; no prospect of returning to that state of roving independence so dear to the wild inhabitants of the forest. The pleasant life of the island was at an end—the dream in the shade by day, the slumber during the sultry noontide heat by the fountain or the stream, or under the spreading palm-tree. They were now obliged to grope day by day, with bending body and anxious eye, along the borders of the rivers, sifting the sands for the grains of gold which every day grew more scanty.

This occurred in 1495, within three years after the first discovery of the island. Nor was the appetite at home in Spain in any respect satisfied with the quantities sent thither. This kind of hunger, we all know, is invariably increased, not allayed by the amount of food supplied—accordingly, an able and experienced miner, named Palo Belvis, was sent from Spain, furnished with all the necessary engines and implements for mining, assaying, and purifying the precious metals.

Attention, however, was soon diverted from the promising gold fields of Cibao in the interior, for the far richer mines of Hayna on the south side of the island. The discovery was made by an accident of a romantic character, and occurred in the year following; that is, 1496. "A young Spaniard, named Miguel Diez, having a quarrel with another Spaniard, fought with him and wounded him dangerously. Fearful of the consequences, he fled from the settlement, accompanied by five or six comrades; and while wandering about the island they came to an Indian village on the southern coast, near the mouth

of the river Ozema, where the city of St. Domingo is at present situated. They were received with kindness by the natives, and resided for some time among them. The village was governed by a female cacique, who soon conceived a strong attachment for the young Spaniard. Diez was not insensible to her tenderness, and shortly married her according to the customs of the country. In time, however, he began to long again for home, and his bride, seeing him often melancholy and lost in thought, with the quick intelligence of female affection, discovered the cause. Fearful that he would abandon her, yet knowing that gold was the chief attraction of the Spaniards, she informed him of certain rich mines in the neighbourhood, and urged him to persuade his countrymen to abandon their present unhealthy and barren settlement, and settle on the fertile banks of the Ozema.

Diez having satisfied himself that the mines abounded in gold, presented himself at the Spanish settlement of Isabella, trusting that the news he brought with him would procure his pardon. Nor was he mistaken. An expedition was immediately formed to cross the mountains to the opposite side of the island where the mines were, along the banks of the great river Hayna. On the western bank of this river they found gold in greater quantities and in larger particles than had yet been met with in any part of the island, not even excepting the province of Cibao. They made experiments in various places within the compass of six miles, and always with success. The soil seemed to be generally impregnated with that metal, so that a common labourer, with little trouble, might find the amount of three drachms



in the course of a day. In several places they observed deep excavations in the form of pits, which looked as if the mines had been worked in ancient times—a circumstance which caused much speculation among the Spaniards, the natives having no idea of mining, but contenting themselves with the particles found on the surface of the soil, or in the beds of the rivers. Bobadilla, who displaced Columbus as governor, “granted universal permission to work these mines, exacting only an eleventh of the produce, instead of a third, as formerly, for the Crown.” It consequently became necessary to increase the quantity of gold collected. Two Spaniards united together in partnership and compelled the Indians to work under them ; one of the principals searched for gold, the other superintended the work. So hard did they drive the poor natives that the eleventh yielded more revenue to the Crown than had ever been produced by the third, under the government of Columbus.

In the meantime the unhappy natives suffered under all kinds of cruelty from their inhuman task-masters. Little used to labour, feeble of constitution, and accustomed in their beautiful and luxurious island to a life of ease and freedom, they sank under the toils imposed upon them and the severities with which they were enforced ; for on the least offence, or the least freak of ill-humour, the Spaniards inflicted blows and lashes, and even death itself. By these means, however, vast quantities of gold were amassed ;—indeed, with such energy and success was the working of the mines carried on, that for several years the gold brought into the smelting-houses of Hispaniola

amounted to 460,000 pesos, or dollars—that is to say, about £100,000.

This amount may not, indeed, appear large in these days, but when the relative value of money in those days and the present is taken into consideration it will in truth appear enormous. For instance, the whole taxation of France, which at that time was considered excessive, fell short of £200,000 sterling; in other words, the gold produced from one small island was equal to one-half the revenue of France; or as Robertson, the historian of America, puts the comparison, a pesos of that day was equal to about a pound sterling of his time, which would make the return equal to about half a million of our present money.

But what was private enterprise about all this time, when only an eleventh of the produce was required to be paid as a royalty? Let us go back to the facts, and mark whether or not there are any in our own day to whom the description will apply.

When the news of the golden discoveries to the south of Hispaniola reached Spain, a great crowd of adventurers hurried thither, all expecting to enrich themselves suddenly in an island where gold was to be picked up from the surface of the soil, or gathered from the mountain brooks. They had scarcely landed, says Las Casas, who accompanied the expedition, when they all hurried off to the mines about eight leagues distant. The roads swarmed like ant-hills with adventurers of all classes. Every one had his knapsack filled with biscuit or flour, and his mining implements on his shoulder. Those who had

no servants to carry their burdens bore them on their backs, and lucky was he who had a horse for the journey—he would be able to bring back the greater load of treasure. They all set out in high spirits, eager as to who should first reach the golden land ; thinking that they had but to arrive at the mines and collect riches, “ for they fancied,” the same writer intimates, “ that gold was to be gathered as readily and as easily as fruit from trees.” When they arrived, however, they discovered, to their dismay, that it was necessary to dig painfully into the bowels of the earth—a labour to which they had never been accustomed ; that it required experience and sagacity to detect the veins of ore ; that, in fact, the whole process of mining was exceedingly laborious, demanded vast patience, much experience, and, after all, was full of uncertainty. They dug eagerly for a time, but found no gold. They grew hungry, threw by their implements, sat down to eat, and then returned to work. It was all in vain ; their labour gave them a keen appetite and quick digestion, but no gold. They soon consumed their provisions, exhausted their patience, cursed their infatuation, and in eight days set off drearily on their return along the roads they had lately trod so exultingly. They arrived at St. Domingo without an ounce of gold, half famished, downcast, and despairing. Such is often the case of those who ignorantly engage in mining, of all speculations the most brilliant, promising, and fallacious.

The gold discoveries of the Spaniards, however, were not long confined to the narrow limits of the small island of Hispaniola, for in the year 1511 the eastern coast of the Isthmus of Darien was dis-

covered, and a small colony settled there. An adventurous soldier, of the name of Balboa, was chosen governor by his associates ; he, however, was a man without high connexions or interest at the Court of Spain, and, therefore, had no hope of having his appointment confirmed unless he could perform some signal service which would secure him the preference to every competitor. To effect this he made frequent inroads into the adjacent country, subdued several of the native chiefs, and collected a considerable quantity of gold, which abounded more in that part of the continent than in the islands.

In one of these excursions the Spaniards contended with such eagerness about the division of some gold, that they were on the point of proceeding to acts of violence against one another. A young chief, who was present, astonished at the high value which they placed upon a thing of which he did not discover the use, tumbled the gold out of the balance with indignation, and turning to the Spaniards said, with warmth, " Why do you quarrel about such a trifle ? If you are so passionately fond of gold as to abandon your own country, and to disturb the tranquillity of distant nations for its sake, I will conduct you to a region where the metal which seems to be the chief object of your admiration and desire is so common that the meanest utensils are formed of it."

Delighted at what they heard, Balboa and his companions enquired eagerly where this happy country lay, and how they might arrive at it. The chief informed them that at a distance of six suns—that is, of six days' journey towards the south—they would discover another ocean, near to which this wealthy

kingdom was situated ; but if they intended to attack that powerful state, they must assemble forces far superior in number and strength to those with which they now appeared. This was the first information which the Spaniards received concerning the great southern ocean, or the opulent and extensive country known afterwards by the name of Peru.

It was not long afterwards that Balboa achieved the formidable adventure of scaling the mountain ramparts of the isthmus which divides the two mighty oceans from each other, when, armed with shield and buckler, he rushed into the waters of the Pacific, and cried out in the true chivalrous vein, that he claimed this unknown sea and all that it contained for the King of Castile, and that he would make good the claim against all Christians and infidels who dared to gainsay it. He, and others after him, however, failed in their endeavours to discover the rich country for which they searched ; that being reserved for the renowned Pizarro, one of those who had accompanied Balboa across the isthmus. It would be quite as instructive, and more interesting, to trace the history of this Spanish bandit (for he hardly deserves a better name), than to prosecute our search for gold ; but the necessity of not wandering too far from my subject compels me to pass over most of the stirring incidents which enliven the history of his adventures, and to mention only such facts as will link the whole together.

In November of the year 1524, Pizarro set sail from Panama, with 100 men ; a small force, indeed, with which to invade a rich, powerful, and extensive territory. However, even the assemblage of crowds

of armed natives to oppose his landing, did not deter him, and when he had succeeded in effecting a landing, he was indebted to a ludicrous incident for the safety of himself and that of his associates. He chanced to have taken with him a few horses, and himself, mounted on one of these, was waging an unequal contest with myriads of well, though rudely armed, natives. His little band was entirely surrounded, and overwhelmed by numbers, when Pizarro happened to fall from his horse. The division of what appeared to be one and the same being into two, so astonished the barbarians that, filled with terror, they fell back and left a way open to the Spaniards to regain their vessels. A real and unquestionable fact this, which most aptly illustrates the ancient fables of the Centaurs, and proves, as convincingly as such a point is capable of proof, that those fables were not the mere inventions of the poets, but sprang from the natural errors of simple and untaught minds.

After many disappointments Pizarro obtained a small reinforcement, and, for the first time, having crossed the line, landed in the Bay of Tumbes, about four deg. south; here he was received by the natives as a superior being, and, with a view to secure their goodwill, in addition to their usual offerings of hawkbells and other trinkets, he gave them some of his live stock, being all of them animals, the like of which they had never before seen: amongst the rest, we are told, he gave them some fowls, and when the cock crew, the simple people clapped their hands and inquired what he was saying.

It was, however, some years later than this—that

is, in the year 1532—that Pizarro's grand discovery was made. He then landed further to the south, with 180 men and twenty-seven horses. At this period, the territory of Peru extended from about the 2nd degree north latitude, to the 37th degree south, that is, a distance of 2,340 miles; nor must we omit to notice its topographical position. A strip of land, rarely exceeding twenty leagues in width, runs along the coast, and is hemmed in through its whole extent by a colossal mountain range, which, advancing from the Straits of Magellan, reaches its highest elevation about 17 degrees south, and after crossing the line, gradually subsides to hills of inconsiderable magnitude, as it enters the Isthmus of Panama. This whole country was at that time governed by a chief, called an Inca, a title, together with the dominion, handed down from father to son, in regular succession. These Incas, we are told, had their baths filled by streams of crystal water, which were conducted through subterraneous silver channels into basins of gold. Their gardens were laid out with various forms of vegetable life, skilfully imitated in gold and silver. Among them the Indian corn, the most beautiful of American grains, is particularly commemorated, and the curious workmanship is noticed with which the golden ear was half disclosed amidst the broad leaves of silver, and the light tassel of the same material that floated gracefully from its tops. If this dazzling picture staggers any one's belief, he may reflect that the Peruvian mountains teemed with gold; that the natives understood the working of the mines to a considerable extent; that none of the ore was con-

verted into coin ; that the whole of it passed into the hands of the sovereign for his own exclusive benefit ! After death the bodies of the Incas were embalmed, and placed in the Temple of the Sun at Cuzco ; they were clothed in the princely attire which they had been accustomed to wear, and were placed on chairs of gold.

Pizarro himself, anxious as he was that his own dreams of uncounted wealth should be realised, could scarcely give credit to the news which his emissaries brought back. The temples were the chief depositaries of their treasure. Of these, the most renowned, the pride of the capital, and the wonder of the empire, was at Cuzco, where, under the munificence of successive sovereigns, it had become so enriched, that it received the name of "The Place of Gold." It consisted of a principal building, and several chapels and inferior edifices, covering a large extent of ground in the middle of the city, and completely encompassed by a wall which, with the edifices, were all constructed of stone—the work so finely executed, that a Spaniard who saw it in all its glory assures us that he could call to mind only two edifices in Spain which, for their workmanship, were at all to be compared with it. Yet this substantial, and, in some respects, magnificent structure, was thatched with straw !

The interior of the temple was the most worthy of admiration. It was literally a mine of gold. On the western wall was emblazoned a representation of the deity, consisting of a human countenance, looking from amidst innumerable rays of light, which emanated from it in every direction, in the same manner



as the sun is often personified by us. The figure was engraved on a massive plate of gold of enormous dimensions, thickly powdered with emeralds and precious stones. It was so situated in front of the great eastern portal, that the rays of the morning sun fell directly upon it at its rising, lighting up the whole apartment with an effulgence that seemed preternatural, and was reflected back from the golden ornaments with which the walls and ceilings were everywhere incrustated. Gold, in the figurative language of the people, was "the tears wept by the sun;" and every part of the interior of the temple glowed with burnished plates, and studs of the precious metal. The cornices which surrounded the walls of the sanctuary were of the same costly material; and a broad belt or frieze of gold, let into the stonework, encompassed the whole exterior of the edifice. All the plate, the ornaments, the utensils of every description appropriated to the uses of religion, were of gold or silver. Twelve immense vases of the latter stood on the floor of the great saloon, filled with grain of the Indian corn; the censers for the perfumes, the ewers which held the water for sacrifice, the pipes which conducted it through subterraneous passages into the building, the reservoir that received it, even the agricultural implements used in the gardens of the temple, were all of the same rich materials. The gardens, like those described belonging to the royal palaces, sparkled with gold and silver, and various imitations of the vegetable kingdom. Animals were also to be found there, among which the llama, with its golden fleece, was most conspicuous, executed in the same style, and with a

degree of skill, which, in this instance, probably did not surpass the excellence of the material.

In order to secure to himself this vast treasure, Pizarro adopted a plan which had already been put in practice by Cortes in Mexico; he took a perfidious advantage of the confidence shown him by the reigning Inca, Atahualpa, and made him his prisoner. The unhappy prince, after a long confinement, which every day became more rigid and more irksome, at length attempted to purchase his freedom. He one day told Pizarro that, if he would set him free, he would engage to cover the floor of the apartment on which they stood with gold. Those present listened with an incredulous smile; and, as the Inca received no answer, he said, with some emphasis, that "he would not merely cover the floor, but would fill the room with gold as high as he could reach," and, standing on tiptoe, stretched out his hand against the wall. All stared with amazement, while they regarded it as the insane boast of a man too eager to procure his liberty to weigh the meaning of his words.

Yet Pizarro was sorely perplexed. As he advanced into the country much that he had seen and all that he had heard had confirmed the dazzling reports first received of the riches of Peru. Atahualpa himself had given him the most glowing picture of the wealth of the capital, where, he said, the roofs of the temples were plated with gold, while the walls were hung with tapestry, and the floors inlaid with tiles of gold. There must, Pizarro thought, be some foundation for all this. At all events it was safe to accede to the Inca's proposition, since, by doing so, he could collect

at once all the gold at his disposal, and thus prevent its being purloined or secreted by the natives. He therefore acquiesced in Atahualpa's offer, and, drawing a red line along the wall at the height which the Inca had indicated, he caused the terms of the proposal to be duly recorded by the notary. The apartment was about seventeen feet broad by twenty-two feet long, and the line round the wall was nine feet from the floor. This space was to be filled with gold; but it was understood that the gold was not to be melted down into ingots, but to retain the original form of the articles into which it was manufactured, that the Inca might have the benefit of the space which they occupied.

The time allowed for collecting this vast treasure was limited to two months, and such was the devotion of the people for their chief that one-half of it was speedily delivered. The articles produced consisted of goblets, ewers, salvers, vases of every shape and size, ornaments and utensils for the temples and the royal palaces, tiles and plates for the decoration of the public buildings, and curious imitations of different plants and animals. Among the plants, the most beautiful was the Indian corn already described. A fountain was also much admired, which sent up a sparkling jet of gold, while birds and animals of the same material played in the waters at its base. Of these works specimens to the value of 100,000 ducats, that is about £50,000 sterling of our money, were reserved to be sent to Spain, the rest were entrusted to the native goldsmiths to be melted down. They toiled day and night; but such was the quantity to be recast that it occupied a full month. When the

whole was reduced to bars of a uniform standard, they were nicely weighed, under the superintendence of royal inspection. The total amount of gold was found to exceed 1,300,000 pesos, which, following my former estimate, would come to the same amount of pounds sterling of the present day. Of this, the share appropriated to Pizarro was equal to £57,000 sterling, besides the chair, or throne, of the Inca, of solid gold, and valued at £25,000 sterling. To his brother, Hernando, was paid £31,000; to an officer of the higher rank about £15,000; and to each of the cavalry £8,800. The infantry, 105 in number, were (half of them) allowed £4,400; and the remainder one-fourth less, that is £3,400 each.

All this was collected in the place where the Inca was a prisoner, or its vicinity, without touching the treasures at Cuzco and Caxamarca and the temple there; but when piled up on the floor of the room which was to be filled, it did not reach above half way to the stipulated height. The Inca then sent messengers to Cuzco to obtain from the royal treasury the gold required to make up the deficiency; and, accordingly, 11,000 llamas were despatched from Cuzco to Caxamarca, each laden with 100 lbs. of gold. But ere the treasure reached its destination Atahualpa was cruelly and treacherously put to death. The terror-stirring news flew like wildfire through the land, and speedily reached the convoy of Indians, who were driving their richly-laden llamas over the level heights into Central Peru. On the spot where the intelligence of Atahualpa's death was communicated to them, the dismayed Indians concealed their treasure, and then

dispersed. Whether the number of llamas was really so great as it is stated to have been, may fairly be doubted; but that a vast quantity of gold was on its way to Caxamarca, and was concealed under the circumstances stated, is a well-authenticated fact. That the Indians should never have made any attempt to recover this treasure is quite consistent with their character. It is not even now improbable that some particular individuals among them may know the place of concealment; but a certain feeling of awe, transmitted through several centuries from father to son, has, in their minds, associated the hidden treasure with the blood of their last king, and this feeling doubtless prompts them to keep the secret inviolate.

Enough has been said to illustrate the vast riches of the Peruvian mines; and the same story of conquest and spoliation, with variations only of dates and names, might be repeated with respect to other portions of the vast southern continent of America.

But I will not trespass further upon the patience of the reader with details of this kind, which the purpose of the present work does not require.

## CHAPTER III.

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### THE AUTHOR'S TRAVELS AND EXPERIENCES IN CALIFORNIA ; WITH AN ACCOUNT OF THE DISCOVERY OF GOLD THERE.

The gold discoveries in Australia—Pretensions to the honour of them—But, meantime, of the gold discovery in California, and how it affected the population of Australia—Wholesale emigration to the American coast—The author sails for St. Francisco—The Friendly Islands—Arrival at St. Francisco—Adventures in the overland journey to the “Diggings”—Paul Pious and his friend Paulinus—A social cup of tea—First experience at the Diggings—Conviction that gold must exist in Australia—Severity of a Californian winter—Observations on the geology of the gold fields—Written opinion of the existence of gold in Australia—The Sacramento and St. Joachim rivers—Sacramento city—Voyage up the river to Marysville—Where the prospect being unfavourable, the Author immediately returned to San Francisco—Sacramento—Sutton's Fort—Story of the gold discovery in California—The Author returns to New South Wales to prosecute his search for gold.

I now come to that part of my subject in which my own personal history, I may say my own character, as one in any degree, whether much or little, entitled to public notice, is involved. In narrating the history of the gold discoveries in Australia, it is far from being my wish to revive, to an unnecessary extent, the petty jealousies and rivalries which such an event might have been supposed to have excited, to the disquiet of the small communities spread over

the extensive territories of this new and almost virgin colony. It is due to history, however, to refer to some points which directly involve the claim to the merit of the important discovery of Australia's mineral wealth. Suffice it to premise, then, that although the voice of public opinion has generally accorded the honours due to that discovery to others, each in his degree and kind—the one a resident in the colony, the other not so—a third gentleman, a resident of long standing in the colony, pertinaciously claims for himself the twofold honour of being as well the scientific as the practical discoverer of gold in those regions; or rather, perhaps, veils his claims as a practical, under those of a scientific discoverer; for he pushes his pretensions in the latter respect so far, and attaches to them such importance, as almost to make the former, the practical discovery, a comparatively trifling consideration. Having so far premised, I shall not at present enter further on this disagreeable topic than to state, that in the course of this and subsequent chapters, I shall hope to show, that whilst Sir Roderick Impy Murchison is entitled to the high honour of having first publicly announced, as the result of profound research and observations in geology and mineralogy, that extensive gold fields must exist among the mountains of Australia, the humble individual who has the honour of penning these lines—without the slightest pretence to scientific knowledge, without having even heard of Sir R. I. Murchison at the time of his published opinions—is entitled to the credit, be it much or little, of having first discovered the actual existence of the large gold fields in that country; of having first

searched there, as a practical miner, or (as it would perhaps be more correct to say) "digger;" and of having drawn the attention of the Colonial Government and people to the discovery, whence has resulted the production of millions of treasure which are now yearly pouring into the mother country, to the enrichment both of itself and of the infant colony.

The proof of these facts, indeed, will be found to lie in a very small compass, but shall receive but secondary attention at my hands, my object indeed being, not that of making out a case, but rather to entertain and inform, in a plain, unpretending manner, those who may take an interest in the past and the future of a colony which promises to add so large a share to the commercial wealth of the world. In so doing, viewing the peculiar character of that wealth now most prominently before us, I trust it will not be considered out of place if I enter even upon some of the trifling and petty incidents that befel me, or crossed my path, from the time that I first sickened of the gold fever to that when my dreams of buried wealth were realised. Such or similar incidents do, or are likely to, befall all who enter on the same course of life; and therefore my reminiscences may serve as a preparative or foretaste of future experiences for any amongst my readers who may hereafter resolve on pursuing the adventurous life of a gold digger; or, at least, may give such of them as have friends so occupied, either in Australia or California, some notion of the kind of adventures their friends are probably meeting with.

Most of my readers may very well remember how the dense population of this country was agitated to



its very centre by the news of the discovery of gold on the west coast of North America, in the autumn of 1848; and if this news, at first so astounding and incredible in aspect, could disturb the quiet and even tenor of the ways of the orderly, industrious, and sober-minded people of this country, whose attachment to their domestic hearths would suffer few but the dissatisfied, the disappointed, the unsuccessful, or the restless, to tear themselves from their loved homes; how much more must it have excited the inhabitants of Australia—men who for the most part have spent their whole lives in adventure, in varied and more or less hazardous enterprise—men who have been content, in search of a rude and often precarious subsistence, to penetrate the densest forests, to make their way over trackless mountains, and to locate themselves in far distant spots completely isolated from the haunts of men, except it be those of the native savage of the bush? To men so circumstanced, and so habituated to toilsome adventure, a simple voyage to an unknown and distant land was no impediment; such men no imaginary hardships could deter from the instant resolve of taking up their blankets and their spades, and setting forth in search of those abundant treasures which the strange news from the other side of the Pacific promised to their eager hopes.

It was not, I believe, until the beginning of 1849 that the news first reached Port Jackson. At that time there was little or no communication between that port and San Francisco; indeed, I believe the very existence of the latter country was as little generally known in New South Wales as it was in

England. The name was certainly to be seen on the map, by those who were in the habit of deriving information from that source ; and there the relations of the civilised world with California ended. At first, therefore, the report gained credence with none but such as would have credited the reported discovery of a Lilliput or a Brobdignag. But when, in due course, a vessel arrived with 1,200 ounces of the precious metal on board, the most incredulous were convinced. The immediate result was the outpouring of a tide of emigration, which, to compare small things with great, resembled the more recent "exodus" from Ireland ; as, if the accounts be not exaggerated, the recent tide of emigration from that country is fitly called. Nor was the movement confined to the already unsettled and adventure-loving inhabitants of the colony ; the newly-arrived immigrants who had but just been brought from England at the expense of the Colonial Land Fund—these, almost without exception, re-emigrated to California, without having done a single day's work in the country which had, in a manner, purchased a right to their labour. To such an extent, indeed, did this movement add to the difficulties of the already embarrassed labour market, that it was proposed to compel, by legislative enactments, bounty-emigrants to remain for a certain time in the colony after their arrival, a plan which was not carried out, only because it was deemed repugnant to the spirit of the British laws.

Fortune had not smiled so favourably on me during a seventeen, or, with little interruption, a twenty-two years' residence in New South Wales, as to make me

proof against the contagion ; and after a little consideration, I took my passage for San Francisco, on board the British barque *Elizabeth Archer*, commanded by Captain Cobb.

There were on board seven cabin passengers, besides myself, and 150 in the steerage. We sailed from Port Jackson in the month of July, 1849, and, being favoured with a strong westerly wind, we sighted the north cape of New Zealand in six days. From thence nothing worthy of remark occurred, until we reached Pitcairn's Island, where we touched for the purpose of obtaining fruit and vegetables.

And here, though it be perhaps somewhat foreign to my subject, I cannot refrain from mentioning how delighted we all were with the good, simple-minded inhabitants of this island, the descendants of the mutineers of the *Bounty*. A more happy or a more virtuous people it is scarcely possible to imagine the existence of. The most valuable natural products of the island are the plantain, yam, and cocoa-nut. The banana, orange, lime, bread-fruit, and sweet and other potatoes have been introduced and grown very successfully. At the time when the *Bounty* first went there there were no animals on the island fit for human food ; but on their return voyage the mutineers brought with them pigs, fowls, and goats, the produce of which is now not only sufficient to supply the inhabitants with animal food, but to afford, in addition, a limited supply to strangers, who from time to time may have occasion to call there in quest of provisions. Yams and sweet potatoes, however, can be had in abundance at a cheap rate ;—two dollars, or eight shillings English money, per

barrel. It is worthy of remark that they have no weights in this little island community,—so simple and primitive is their mode of life. The American flour barrel is their measure for yams and potatoes; while oranges and cocoa-nuts are sold by the 100. Having in the course of a couple of days' stay obtained a good supply of what we stood most in need of, we left this little community and shaped our course for San Francisco, where we arrived in the month of October, after a passage of seventy-eight days.

As we entered the harbour, about 500 sail of shipping came in view, presenting a complete forest of masts—a sight well calculated to inspire us with hope, and remove the feelings of doubt and dejection, which, in the course of a long voyage, are apt to take the place of the first eagerness for novelty and adventure. Boats from the shore and from ships that we had spoken on our voyage soon boarded us to welcome our arrival. “There is gold—plenty of gold—for all those who will work for it,” was the answer to our numerous inquiries. Eager, however, as we were to set to work, an accident, now of frequent occurrence in San Francisco (and subsequently at Port Jackson), deterred the cabin passengers from proceeding on shore for some days. The whole crew deserted on the night after our arrival in port, excepting one officer and the apprentice boys, four in number; in which dilemma, in token of our sense of the captain's gentlemanly and friendly conduct throughout the voyage, we agreed to remain on board and assist him in the discharge of his cargo.

This detained us for no less than three weeks. In

the meantime, however, we had formed amongst ourselves a party of eight, who agreed to join in an expedition to the gold fields. My companions paid me the unlooked-for compliment of choosing me as their president; an office of little responsibility, though, in case of an equal division of votes, it gave the casting-vote to me. Before starting we added a ninth to our number, in the person of my friend Mr. S. Davison, who, alone of all the party, continued with me nearly during the whole of my sojourn in California. The terms of agreement between the members of the little association were, that each was to pay an equal share of the expenses, and to use his utmost exertions in the prosecution of our common object, and, of course, to share equally in the profits.

All preliminaries being settled, we set sail from San Francisco up the river San Joaquin, to the camp or town, now the city of Stockton. On our passage up, which lasted two or three days, I, with the assistance of one of our party, completed a calico tent capable of affording sleeping accommodation for nine persons. We reached Stockton about the 1st of November, and lost no time in seeking to engage a waggon to convey our provisions and baggage to the mines, a distance of about seventy miles. We were not long in finding one; for which, with a team of eight bullocks to convey our loading to Woodstock, or to such place near there as we might determine on, we agreed to pay, on arriving at our destination, no less a sum than 500 dollars, or £100 sterling.

Our driver's name I forget; but as I shall have occasion to mention him again, I will give him the designation of Paul Pious; for he made considerable

pretensions to being religious, though in the sequel his conduct did not square with his professed principles. And, speaking of him, I cannot forbear mentioning what appeared to me a droll peculiarity in American manners. While I was bargaining with him for his waggon and team, I observed that he had a piece of wood in one hand and a pocket-knife in the other; and with the latter he kept cutting the wood most energetically, and without intermission. In reply to my enquiry as to his object in doing so, he said, "It is customary in our country to *whittle considerable* when we are driving at any thing. In my native state, Ohio, bundles of whittling-sticks are always placed on the tables at the inns for that purpose, as people go there to conclude their deal and take a drink. If no whittling-sticks were on the table, the chairs, or table itself, I guess, would be soon whittled away."

In an hour, or less, Paul made his appearance, and announced himself as ready "to take up the plunder." "Plunder," said I, "we have no plunder." "Well, your freight," said Paul, "we call it plunder." And such I afterwards found was the name commonly applied by men from the back States to provisions and baggage of all kinds. At about one in the afternoon we started on our journey, went on very comfortably through a fine open, level country, interspersed with large oaks, and halted at about three o'clock at a watering-place, where we refreshed ourselves and the cattle. Then proceeding seven miles further on, we camped for the night by the side of a creek.

Not a drop of rain had fallen for seven months,

consequently the grass was completely dried up, which held out no very pleasing prospect as regarded fodder for the cattle. This was our first night on land, so we were not yet prepared for, or inured to, the hardships which this climate, so much colder than that we had left, might bring upon us. However, we unyoked the bullocks, or steers, as they are always called in California, and erected our capacious tent completely over the waggon. It was fortunate that we did so, for scarcely had we completed our work, when the rain poured down in torrents, accompanied with strong wind. Our only bedding consisted of the blankets in which we were wrapt; and as our tent was not properly set, the rain kept beating under the tent, flapping a portion of it in my face, the agreeable effect of which was just as if a wet dish-cloth were being drawn backwards and forwards across my head. Still it was a great consolation to reflect that our provisions were under shelter, for had they suffered material damage our prospects would have been utterly ruined.

At daylight, when we got up, it was still raining, and Paul said, "he guessed the rainy season had set in;" but after we had made a homely breakfast of tea and biscuit, the weather cleared up a little, so we resolved on continuing our journey. With difficulty we advanced seven miles, having travelled ten on our first day. The rain continued the whole of the following night, and the roads, if such they may be called, became so bad that we were forced to submit to a detention of two days.

Here we were joined by another party of nine or ten young Americans, bound to the same diggings as

ourselves, with a waggon and team, the owner of which (Paulinus I will call him) was a friend of our driver. We were at first delighted at this accession to our travelling party, considering, amongst other reflections, that in case our team should meet with any difficulty, the united strength of the two teams would be of the greatest service. Soon, alas ! we had good reason to regret having fallen in with our new acquaintances. Our third day's journey, a distance of fifteen miles, was completed with some difficulty. We camped in our usual fashion, with the tent over the waggon, and early in the following morning heard Paul very busy with his steers.

"Do you intend to travel to-day, Paul?" said I.

"Well, I guess I am going to do nothing short of that any how;" was Paul's reply.

"Shall we get ready," I asked.

"No;" said Paul, "I guess the rainy season has fairly set in, and I am going to help these other boys on, and will come back for you next spring; mayhap before if the weather takes up. There is a very bad swamp at the end of the plain, and requires two teams to one waggon anyhow."

"Well," I said, "I suppose if you take the other waggon over the swamp, you will not return until to-morrow."

He replied, "Well, now I do declare that's a considerable calculation;" and, without a word more, Paul and his friend, with our eight bullocks yoked to the other waggon, started off, and we saw nothing more of any of them for eleven days.

Of course we expected to see Paul back on the following day. Still we had the wants of the day to



provide for ; and of those wants on such an occasion not the least important, is wood. But, unhappily, we were encamped on an extensive plain, without a tree in sight. However, when the morning fog had cleared off a little, Mr. Davison and I, on going to the highest point of the hill on which we were then encamped, discovered a tree at a distance of apparently about two miles. He and I at once agreed to set out and astonish our party by bringing home each a load of wood.

Whatever may have been sung or said in praise of " a social cup of tea," I venture to assert that the enjoyment a bushman or traveller in Australia or California derives from that simple luxury is far beyond anything that poet, essayist, or teetotal orator ever imagined, or pictured. He, indeed, has it not served up on a silver salver, nor infused in a silver teapot ; he does not sip it from Sevres or Worcester China ; he knows not the refinement of cream or milk, nor does he look for the delicate accompaniments of muffin, buttered toast, or transparent bread-and-butter. His tea-equipage consists commonly of a kettle saucepan, or tin-pot, with a small tin-mug to drink from, and perhaps a stick for a spoon ; his only seasoning is, for the most part, coarse brown sugar, and his food hard biscuit or damper, that is, plain unleavened bread without butter ; but his enjoyment in the repast is great in proportion to the rudeness of the *ménage*, and the urgency of the occasion, meaning the keenness of the appetite. To furnish forth such a meal we took our morning walk of two miles and back, and when we had partaken of our humble repast we felt ourselves,

so far both mentally and physically invigorated, that all past and future cares were thrown aside, and we determined to make the best of our present embarrassing condition.

Accordingly, having pitched our tent more comfortably, and trenched it round to secure ourselves dry beds, we had only to determine how to occupy ourselves during the remainder of the day, vainly imagining it would be the only one in which we should be so circumstanced. It was soon settled that six of the party should go out with their guns in pursuit of game, that one other and myself should bring in wood, and that the ninth should take charge of the tent. On returning with our load for the third time from our solitary tree, the only one within a distance of eight miles, my companion and I found the whole party reassembled, some with ducks, some with geese, and one with a fine hare. I need not say how much we enjoyed our supper, and how we talked of the adventures of the day, and slept as if care was unknown to us. On the evening of the next day we fully expected to see Paul again, but that day and nine more, each more weary and dispiriting than the former, passed before he made his appearance.

At length, on the evening of the eleventh day, we were saluted with the pleasant greeting from the lips of Paul and his friend Paulinus, "Good night, boys!"

"Good night, boys," exclaimed the latter. "How do you get along in them times?"

"Well, I do declare," said Paul, "you have made yourselves mighty comfortable here; five tidy

beds. Well, I guess you are located finally for the winter, any how."

Remonstrance on our part against his treatment was so utterly thrown away upon him, that he declared his determination to take away his waggon, and leave us to provide for ourselves as best we could. This was not to be tolerated. But at that time all that we could prevail on him to do, was to draw our "plunder," as he still persisted in calling it, across the swamp where he proposed to leave us provided with plenty of wood for the winter.

The morning after we reached our proposed winter quarters, he and Paulinus began very deliberately to unload our waggon, from which a show of very determined resistance, however, for the moment, deterred them. When, however, they found that we were too many for them, they went away with the expressed intention of bringing with them "a lot of boys" from a neighbouring camp, who were to assist them in taking forcible possession of the waggon. We occupied the interval of their absence in preparing ourselves for a vigorous resistance; but fortune turned in our favour. In about half an hour our pious friend and his comrade returned with only a third person in their company, who happened to be the proprietor of the "run" on which we were; and he, on hearing the particulars of our story, took our part; so at length it was settled that Paulinus should select one strong team out of the two, and take us to our destination, in consideration of an additional fee of fifty dollars. Our property was quickly removed from Paul's to Paulinus's waggon, and once more we made a start.

On the afternoon of the same day, we reached the

Stanislaus River, a distance of eight miles. On its banks we saw a few Indians spearing salmon, as they passed and repassed in shoal water. We purchased some from them, which we found very good eating; but the flesh was not so pink as that of our European salmon, and was somewhat coarser. The Stanislaus is one of the principal tributaries to the San Joaquin; and I should suppose it is now thickly peopled, as it is well adapted in many places for agricultural, and everywhere for pastoral purposes. It takes its rise in the Sierra Nevada, and is fordable only in the latter part of the summer, and then but in few places.

I will not weary the reader with a continued detail of our every day's progress, having said enough, as I think, to prepare any who may be about to seek their fortunes at the gold mines, either of California or Australia, for the kind of hardships they must expect to encounter. It will suffice, in addition, if I briefly describe the gradual changes in the country until we reached the region of gold.

After leaving the Stanislaus we passed through a great deal of trap country, varied with the presence of a very friable granite. The next day we passed by a flat-topped mountain, having the appearance of a mass of iron; no vegetation grew upon it, and on examining it we found that it contained a vast quantity of the above-mentioned useful metal. On the following day we had only a few miles further to go, in fact we were in the gold fields; quartz and slate were now everywhere abundant, with trap dykes protruding from the surface in all directions. On nearing Hood's Creek we saw gravel and fragmentary

quartz in great abundance. Before us was the Digger's City, a city of tents; but we had no leisure for idle speculation. One of our party and myself went forward to select a spot whereon to pitch our tent and commence operations, and a friend of Paulinus kindly took us to a little creek and gave us the first lesson in gold washing.

As it is my intention to devote the whole of a subsequent chapter to an account of the various methods of washing for and obtaining gold, I will not now stop to describe the most simple method of hand or pan-washing. After we had received this our first lesson in gold washing, and had fixed on a location, we returned with our new acquaintance, who, we afterwards learnt, was a magistrate from the state of Ohio. We took back with us to our camping-ground a few small pieces of gold, the produce of our maiden efforts.

Our tent was soon pitched, and our "plunder" taken from the waggon; then Paulinus bade us farewell, cautioning us to beware of the grizzly bears. Our first care was to provide beds for the winter; mine consisted of slates as the ground-work, from which I knocked off the sharp corners with a crow-bar, and on them were strewn a few small pine branches. This was my bed during the whole winter; and had I been better supplied with blankets I should not have envied a prince on his bed of down.

Our camp was a quarter of a mile from York Town, Empire Hill, and near a footpath leading to James Town; these two places were mining stations, each containing some hundreds of inhabitants, who were mining in the immediate vicinity. Our first

want was boards, wherewith to make a cradle or two to wash the auriferous earth. Pan-washing is merely resorted to for the purpose of testing the mineral qualities of the soil, and by gold diggers is called "prospecting."

To our dismay, we found that at James Town boards were sold by weight, the price being one dollar, or 4s. a pound. Unhappily, our funds were not in a state to allow of our indulging in so costly a commodity, so we determined to be content with pan-washing until we could procure sufficient gold to purchase a ready-made cradle. This necessity, I may observe, was less to be regretted, because every gold digger ought to be proficient in pan-washing before he attempts the more laborious task of digging and cradle-washing. On the morning after our camping eight of our party set to work; the ninth had to perform the duties of cook or servant of all-work. The value of our first day's labours amounted to about 7s. each, one of our party having obtained 12s. worth of gold. This was not much towards the purchase of a cradle, but for beginners was sufficiently encouraging to induce us on the following day to lay out £12 in the purchase of a cradle; this sum was raised by a "call" on the shareholders. The method of using this implement I must reserve for a subsequent chapter, in which, as I have before intimated, it is my intention to speak of the various methods of obtaining gold.

Our first attempt at cradle-washing was a complete failure; eight of us worked hard the whole day, and returned to our tent at night, covered with mud from head to foot, with the scanty earnings of 12s., or eighteenpence each. We found that we had mis-

taken both the mode of placing the cradle and of handling it; so, warned by our first failure, we soon made ourselves master of the proper mode of using the instrument, and for our reward managed to average about six dollars a day; poor pay indeed for men who had travelled so many thousand miles with the hope of making a rapid fortune!

But far more important thoughts than those of present success or failure were, from the very first, growing up in my mind, and gradually assuming a body and a shape. My attention was naturally drawn to the form and geological structure of the surrounding country, and it soon struck me that I had, some eighteen years before, travelled through a country very similar to the one I was now in, in New South Wales. I said to myself, there are the same class of rocks, slates, quartz, granite, red soil, and everything else that appears necessary to constitute a gold field. So convinced did I become of the similarity of the two countries, that I mentioned my persuasion to my friend Davison, and expressed my belief that we should soon hear of a discovery of gold in that country, and my determination, if it was not discovered before my return to New South Wales, to prosecute a systematic search for it.

Of my companions, some laughed at me, and others reasoned against my theory. The reasoners very forcibly objected that many professed geologists had travelled over the country to which I referred; and that if it was auriferous they must necessarily have discovered it. But I knew how different scientific knowledge was to practical experience. I knew that the greatest philosophers had sometimes missed most important

discoveries in science, which an unlettered mechanic had afterwards worked out practically. It was very possible, nay probable, I thought, that a man deeply read in the science of geology should be ignorant how to wash a pan of earth in search of gold, or where to look for it; just as a great mathematician may be ignorant how to turn an arch, or even lay a brick. Therefore I clung to my belief, grounding my faith on the uniformity of nature's operations. Meanwhile we kept on steadily at our work, continually increasing our earnings as we gained experience. But as we approached the depth of winter, the difficulties we had to surmount were greatly increased. Frequently we had to clear the snow from the surface, and break the ice in order to get water to wash the gold with. But our sufferings at night were far more severe. It was scarcely possible to sleep from the intensity of the cold, and often we had to get up at night to shake the snow off the tent, for fear of its breaking through. For my own part I made a bag of my blankets and rug, and slept in that; but even that was insufficient to keep warmth in my body. Fortunately I had by me two empty hempen flour-bags, which had been wet on our journey up, and the interstices filled with flour, forming a sort of paste inside; I therefore got into one of these, after having first enveloped myself in the blanket sack, and put the other over my head; and thus equipped I managed pretty effectually to retain the natural warmth of the body through this trying winter. Many persons died of cold during this bitter season. It seemed to us as if it would never end; nor could we get any certain information as to the time it



would break up. We used to watch the oak-trees very narrowly, and by cutting them, endeavour to observe whether the sap was beginning to rise. At length, early in March, 1850, the green buds of the oak, and the cheerful singing of the birds, assured us that spring was at hand.

As the weather now enabled us to seek to better our fortunes elsewhere, our party broke up by mutual consent; or I should say the partnership had become terminated by effluxion of time, as the period we had agreed to work together had now elapsed. If I recollect right, our earnings never exceeded one ounce per diem, or fell short of five dollars' worth, after our experimental trial.

Before I quit our first station at the gold mines of California, I must say a few words of our neighbours there, and of the character of the country itself. We fell in with people from all parts of Europe and America; with our own countrymen from Australia, with Frenchmen, Spaniards, Portuguese, Mexicans, Chilians, Peruvians, and those from the various states of America. The great majority were from the back states of America, and had come overland. Generally we found them to be as neighbourly as one could expect or wish, always ready to afford any information in their power to impart, and moreover, honest and straightforward in their dealings.

As regards the geological structure of the country, being no professed geologist, I can only give my observations in my own way. To be brief, the diggings I was now leaving were flanked by granite and trap rocks, with, besides, a good deal of basaltic whinstone. The digging ground was composed of slates

traversed frequently by trap dykes and quartz veins, which generally ran north and south. We worked for gold in the drift overlaying the slates, and also found gold in the laminæ of these rocks; the largest deposits commonly rested in the indentations and cavities of the slates. In some localities the gold was found evenly distributed through the soil from the surface downward; so even, indeed, that one could calculate to a nicety the produce of any given quantity of drift. In other localities the rock was not struck for twenty feet, and no gold was to be found at or near the surface; perhaps not until one got to within two or three inches of the bed rock. A good deal of emery and small pieces of iron, together with small rubies and sapphires were found with the gold. The drift itself was formed of ferruginous clays, gravel, fragmentary and granular quartz, angular and rounded fragments of the various slates—mica, talcose, chlorite, and feldspar. Slate in a compact form was generally the bed rock. Good deposits of gold were frequently found in the laminæ of the soft feldspathic slates, resting on a substance resembling pipe-clay. I will add that this auriferous drift covered an extent of country for many miles in length and breadth, and was from one inch to fifty feet thick, with gold in greater or less quantities throughout the whole of it.

After our party had broken up, some of us agreed to go together to another diggings about eighteen miles distant, but as I stayed at the latter spot but little more than a week, I need only observe that during that brief space I met with more than average success. In March I started for San Francisco, and in three

days reached Stockton. Being detained at the latter place by heavy rain, I fell in with a Colonel B., late of the United States Volunteers, who told me he had taken a contract to build an oven and a chimney for a man who "he guessed was going into baking." He asked me to join him in his work; and when I declared my want of experience in this branch of industry he replied, that "I could mix mortar and help along." I mention this as one of a thousand instances that might be given of the strange resources to which luckless adventurers in a new gold country may have to apply themselves. As, however, his proposal did not accord with my views, I declined it.

From Stockton I proceeded to San Francisco by water and arrived there in two days. It was now that for the first time I ventured to put in writing my belief in the existence of gold in New South Wales. My confidence in the conclusion I had come to was never for a moment shaken, but for the time I had had other more pressing calls upon me. I was unwilling, after having taken so long a voyage in search of fortune, to return no richer than I came; added to which, during a considerable portion of my sojourn in California I was gaining experience which would stand me in good stead, whenever I should commence prosecuting my searches for gold in Australia. My first written announcement on the subject above referred to, was contained in a letter addressed by me to my friend Mr. S. Peek, a merchant in Sydney; dated San Francisco, 5th March, 1850. That letter has since been returned to me by Mr. Peek, and I now have it in my possession. As a matter of curiosity in the history of discoveries, I extract the passage referring to this subject.

*Extract from a letter written by Mr. Hargraves at San Francisco, 5th March, 1850, to S. Peek, Esq., of Sydney :—*

“ I am very forcibly impressed that I have been in a gold region in New South Wales, within 300 miles of Sydney ; and unless you knew how to find it you might live for a century in the region and know nothing of its existence.”

In San Francisco I again fell in with my friend Mr. Davison. It was agreed that we should try the Northern Diggings during the summer, but as it was as yet too cold to go north, we bought a small craft of about six tons burthen and determined to start at once, intending, if the snow prevented our progress onwards, to sell our cargo and return again to San Francisco.

Before leaving San Francisco I met with a gentleman with whom I had previously been slightly acquainted in New South Wales. He professed to be, and for all I know was, well versed in chemistry, geology, mineralogy, and other kindred sciences ; and, accompanied by his two sons, had brought with him a machine of a very expensive description, (£400, I think, was its cost) for the purpose of extracting gold from the soil. I had heard of this machine before I left New South Wales ; but its mode of operation had been kept a profound secret. It soon appeared, however, that the gentleman in question was practically as ignorant of the method of working for gold, as I had been before I landed in California ; and he did not hesitate to explain to me the nature of his machine and to ask my advice on the subject. Upon examining the machine, I at once was convinced of its utter uselessness, and of the absurdity of my friend's dragging

with him a machine of a ton weight, having as many brass cocks, screws, winches, and other complicated contrivances as would require the constant superintendence of a practical engineer, and which, after all, would not do one half the work of an old packing case converted into a cradle. This gentleman was sufficiently convinced by my observations to induce him to leave his cumbersome machine behind him, and to accept an offer which Mr. Davison and I made him of a passage up the Sacramento river.

The Sacramento river falls into the same bay, the Sousoon, as the San Joaquin river, before mentioned. These two rivers form a vast delta, which is almost on a level with them, and a perfect marsh. The former (the Sacramento) flows in a southerly, the latter (the San Joaquin) in a northerly direction. Fever and ague almost invariably ensue from a voyage up either, more especially in the summer and autumn. We made the whole distance, 180 miles, to Sacramento City in ten days against a very strong current.

This city is situated at the confluence of the American river with the Sacramento, and at the time I saw it was not what would come up to an Englishman's idea of a city, consisting only of a heterogeneous assemblage of fragile wooden buildings. Nevertheless, thousands of people thronged the streets, and a vast amount of business was being carried on in it. Suttors's Fort, the original residence of Captain Suttors, is distant about a mile and a-half from the river, but was at the time of my arrival occupied as a hospital. I shall hereafter have occasion to speak of this place which I subsequently visited from motives of curiosity.

Having procured a supply of very fine beef, for which we paid 4s. per lb., we again started for our place of destination, which we reached in a few days, making in all fifteen days from San Francisco.

After we left Sacramento City the country improved very much, became higher, and had the appearance of being free from inundation, though we afterwards found by experience such was not the case. The banks of the river were lined with oaks and sycamore, the trunks and branches of which were covered with vines, producing a pleasing effect. The country was inhabited by a few settlers here and there, and the plains formed the runs of the various "ranches"—(so the farms, or cattle runs, are called)—on the river. I should observe, that about twenty-five miles above Sacramento City we left the Sacramento River, and followed the Feather River, a tributary of the latter, on which we continued until we arrived within half a mile of Marysville on the Yuba, our place of destination. The Yuba is a tributary of the Feather River, and only navigable for about half a mile, except in heavy freshets, when flat-bottomed steamboats go a few miles further up, not, however, without some risk.

We were now at Marysville on the Yuba, from 250 to 300 miles from San Francisco. We immediately landed, pitched our tent, and removed our effects into it. But as we could see the snow on the mountains north of us, and found that many others were waiting to go north, we considered that it would be better to retrace our steps, disposing, previously, of what stores we should not be in need of. This being agreed upon, while my friend Mr. Davison

proceeded to Foster's Bar, to instruct our friend already spoken of in the art of gold washing, I staid in charge of the boat. They both returned in ten days, when we sold the remainder of our flour, and set out again for San Francisco, which, having a strong current and wind in our favour, we reached in two days and a half.

I will not trouble the reader with the details of my subsequent devious course ; I will only state, that later in the season we once more went in our boat to Sacramento and on to Marysville, whence I again returned to Sacramento City, to sell our little craft, which had been so useful to us. On this occasion I paid a visit to Suttor's Fort, which, as I have mentioned, is situated one mile and a-half from the river, and is a spot of great interest, in connection with the newly-discovered wealth and rapid rise of this country.

This place was originally the residence of Captain Suttor, and with him and his residence here, the history of the discovery of gold in California is intimately connected. I will tell the story as I heard it on the spot. It was thus :—Captain Suttor had received from the Mexican Government a very large grant of land, I think 60,000 acres, on condition of his settling there, and introducing agriculture, and endeavouring to civilise the Indians in his immediate vicinity. He chose for his site the spot where now stands the city of Sacramento. There he built the fort, and, from the first, succeeded very well. His land ran back from the river to the spurs of the Sierra Nevada, where there was abundance of timber.

In 1848 many Americans came overland to spy

out the country and settle in it, which induced Captain Suttor to erect a saw-mill, for the purpose of supplying the newly-arrived emigrants with timber, and probably of sending some to Monterey also. For this purpose he required an engineer, and hearing of one Marshall, a person from New South Wales, at St. Diego, Captain Suttor sent for him, and gave him the needful instructions. When the works were so far advanced as to allow the mill being set going, it was discovered that the race was not sufficiently deep; whereupon Marshall ordered the Indians to dig it deeper. Whilst this was in course of doing, the water being very clear, Marshall's attention was attracted here and there to several bright specks, which he could plainly see at the bottom of the water. These he at first took up, carelessly, between his thumb and finger, and threw away again, thinking nothing of the matter. Next morning, however, he saw a great many more specks, some much larger than the others; and imagining that it might be gold, he collected some dozen of scales, which he forthwith took to the fort, where he found the Captain at tea. Anxious to know the Captain's opinion, he at once produced what he had found;—and gold it proved to be. Now, amongst the newly-arrived emigrants, there happened to be an old Georgia gold-miner, who, when he heard of the discovery, hastened off with others to the spot, made a cradle, and set to work. Many others did the same. Thus commenced gold digging in California. The Georgia miner taught the people in the first instance how to obtain the gold by washing, but for which, in all probability, notwithstanding what had been found of it,



the story of its discovery might have passed away and become a mere idle tale, like that of the shepherd who found gold near Wellington, in New South Wales, thirteen years ago ; for neither Captain Suttor nor Mr. Marshall knew how to obtain it except by picking it up with their fingers.

After viewing the fort and surrounding country, I moved on towards the town, and thence onwards, by steamboat, to Marysville again, and at length to the diggings at Foster's Bar, and to the forks of the Yuba. Here the throng of diggers was so great that we could not find a single vacant claim. All were engaged ; and some that were not workable were changing hands at from 500 to 1,000 dollars each. This being the case, we were driven—meaning Mr. Davison and myself—to start again in search of other diggings ; and having heard a favourable account of the Slate ranges, distant about eight miles from our present station, Foster's Bar,—thither we accordingly moved, towards the latter end of June. Here we met with better success than had hitherto attended our efforts, getting about two and a-half ounces daily between the two. But the greater our success was, the more anxious did I become to put my own persuasion to the test, of the existence of gold in New South Wales. So—having stayed at Slate Range as long as the weather would permit, that is, until the beginning of the following November—we returned to San Francisco for the last time. In a few days afterwards I set sail for Port Jackson in the barque Emma, Captain Devlin, bent on making that discovery which had so long occupied my thoughts, and reached that place early in January, 1851.

My friend, Mr. Davison, remained in California, but promised to follow me when I had actually proved the correctness of my assertions as to New South Wales being a gold country ; and this he has since done.

## CHAPTER IV.

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### THE SCIENTIFIC AND PRACTICAL DISCOVERIES OF GOLD IN AUSTRALIA; WITH AN ACCOUNT OF THE AUTHOR'S TRAVELS AND RESEARCHES THERE IN 1851 AND 1852.

Practical discovery of gold in Australia made by the writer—Disputed claims of Sir R. Murchison and Mr. Clarke to the honour of the scientific discovery—Accidental discoveries of small samples of gold at various times—Count Streleccki's Report on the geology of Australia silent in respect to gold—The Author's journey to the Blue Mountains in quest of gold—Account of his various discoveries—Arrangements on the subject with the Colonial Government—Appointed Commissioner of Crown Lands—Disappointment of the first gold diggers—Examination and report on various gold fields—Gold fields of Victoria—Author returns to Sydney, and receives £10,000 from Government as the price of his discovery.

I PROPOSE, in the present chapter, to give a succinct history of the discovery of gold in Australia. In so doing, it would be far more satisfactory to me if I could feel myself justified in confining my remarks chiefly to my own share in that discovery, leaving to others to settle among themselves their conflicting claims, upon scientific grounds, in regard to that discovery—claims which in no way interfere with mine, which touch alone the practical result. But this I cannot do; a history of gold discoveries, whether those

in California or Australia, being obviously incomplete, unless some attempt be made in it to award honour where it is due, and to strip the pretender of his borrowed plumes to which he has no right.

I have all along disclaimed any pretensions to scientific knowledge. Without any knowledge whatever of the science of geology, I simply compared, in my own mind, the geological formations which I saw in California with others that I had seen in Australia eighteen years previously ; and, becoming fully persuaded that if the existence of gold was to be tested by such outward appearances, gold must exist in Australia as well as in California, I acted on that persuasion, and, as will be seen in the sequel, at the very first trial discovered the existence of gold where I had imagined it to be, and in an alluvial form. That important discovery I immediately communicated to the Colonial Government and the public generally ; the immediate result of which was, the opening out and working of mines of enormous productiveness in various parts of that country.

Several years, however, before this practical discovery took place, the existence of gold in Australia had been confidently prognosticated by Sir Roderick Murchison ; and since my discovery the Rev. W. B. Clarke has laid claim to the honour of having made similar prognostications long before Sir R. Murchison. This gentleman, though he does not deny Sir R. Murchison's entire independence and originality of views, yet puts his own claims forward with such pertinacity, that if they be considered well grounded, his rival's share in the honours due must be but of trifling import, seeing that in all scientific discoveries, as well

as in all mechanical inventions, the second discoverer must always yield the palm to the first.

Sir Roderick Murchison himself has thought it worth while to remonstrate with the English Government for having omitted all mention of his name in the published Parliamentary Report of the Gold Discovery. *That report was drawn up by Mr. Clarke;* who, in answer to Sir R. Murchison's complaint, says that he had made "*silent mention*" of him. Silent mention indeed! If there was to be any silence in the case, it surely would have been more becoming had Mr. Clarke made only silent mention of himself, and given to Sir Roderick Murchison the meed of praise to which he is so justly entitled. However, I will not anticipate conclusions; I will set forth the simple facts as alleged by each claimant, and suggest what appears to me to be the only just conclusion, from a consideration of their several statements.

And, first, of the claims of Sir Roderick Murchison. In the year 1844 that gentleman instituted a comparison between the rocks of Eastern Australia—numerous specimens of which had been brought home by Count Streleccki—and those of the auriferous Ural Mountains, with which he was, personally, well acquainted. His observations upon this comparative view were printed in the same year (1844) in the Journal of the Royal Geographical Society. This, then, was the first *published* declaration of opinion that gold must exist in Australia. Again, at the anniversary meeting of the Royal Geological Society of Cornwall, held at Penzance, in the year 1846, Sir Charles Lemon, the president, in the

chair, Sir Roderick Murchison made an address upon the same subject, in which he urged the superabundant Cornish tin miners to emigrate to the colony of New South Wales, and there obtain gold from the alluvial soil in the same manner as they extracted tin from the gravel of their native country. Again, in the year 1846, when some specimens of Australian gold ore were sent to him as an authority on the subject, he, on the 5th of November of that year, addressed a letter to Earl Grey, then Secretary for the Colonies, stating his views as to the existence of rich gold fields in the colony. From all which Sir Roderick justly infers, that as his memoirs of 1844 and 1846 are anterior to any other printed documents relating to Australian gold, so he was the first person who wrote to her Majesty's Government on the actual discovery of specimens of native ore, and who urged that a well-regulated search for it should be instituted, not as a crude speculation or matter of guess work, based merely on theory, but as the direct result of inductive reasoning, founded upon facts and extensive geological observation. Such are the grounds on which Sir Roderick Murchison's claims to be the first scientific discoverer of gold in Australia rest.

Let us now see what are Mr. Clarke's pretensions. As the foregoing summary of Sir R. Murchison's claims has been taken from a letter of his to the Colonial Secretary, bearing date July 8th, 1853, so it is but just to take Mr. Clarke's account of his own pretensions from his answer to that letter, addressed to the Colonial Secretary of New South Wales, and dated the 21st of December, 1853. After disclaiming any desire in the slightest degree to diminish the

value which Sir Roderick Murchison assigns to the dates of the printed documents above alluded to, and likewise disclaiming any desire to depreciate the importance of his communication to Earl Grey in 1848, Mr. Clarke proceeds :—

“But I trust I shall be allowed to claim equal value for my own communication to his Excellency the late Sir George Gipps, on the 9th of April, 1844, to members of the Legislative Council of this colony in the same year, and to other residents in this colony two years before, respecting my own anticipations of gold, which were derived, not from such comparisons with the writings of Sir R. I. Murchison as that gentleman has mentioned, but from my own observation of the geology of New South Wales, and from personal discovery in 1841 that its rocks are auriferous. Without, then, wishing in any way to detract from the independent merits of my illustrious friend, or to deny the advantages in maturing my opinions which I may have derived from his accomplished studies and extensive researches in Russia, I desire finally to record here, that the only claim I have hitherto preferred is, to have been the first person in Australia who announced, generally, as indicated upon geological principles combined with personal experience, that it is a rich auriferous region; and I do not conceive that, in common justice (as respects any claim advanced out of the colony), this will be denied; for it is utterly impossible that any information from any other writer could have been obtained by me in 1841, or that in 1844 I could have profited by the publications of Sir Roderick, especially from those which I have not seen between 1844 and 1848. I rely on

the candour of the Governor-General to permit this vindication of my right to be considered as having been connected with the question of gold in Australia from the year 1841, to be placed on record in connection with the just claims of Sir Roderick Impey Murchison, as the anticipator and the predictor of gold in Australia from the earliest period to which he bears testimony."

This is but a summary of Mr. Clarke's claims. His own evidence, given before the Select Committee of the Legislative Council of New South Wales, on the 24th of September, 1852, enables us to test the value of each particular. It will be observed, that in the above extract from his letter in answer to Sir Roderick Murchison's, Mr. Clarke refers no less than three times to his own personal discovery of gold in 1841. Now let us see to what that discovery really amounted. Mr. Clarke says, in his evidence, referring to the year 1841 :—

"When I crossed the dividing range to the westward of Paramatta, in endeavouring to satisfy myself as to the extent of the carboniferous formation in that direction, I first became aware of the existence of gold in Australia, by detecting it at the head of the Winburndale rivulet, and in the granite westward of the Vale of Clwyd."

Became aware of the existence of gold in Australia! He means, as his subsequent evidence shows, that he found a piece of quartz containing gold ; for, when asked how much gold there was in the specimens he found in 1841, he answers :—"The weight of one specimen was about a pennyweight ; it was what might be termed a fair sample." And, throughout



his evidence, he mentions no other specimen as having been found by him; whence it is fair to infer that he found none worth mentioning, nor was it likely he should, as he was avowedly not searching for gold.

Now, is this discovery a practical or a scientific one? It is clearly not scientific; for Mr. Clarke expressly states, "*At that time I knew nothing of the history of gold*"; but since then I have obtained every information I could on the subject." As has already been noticed, Mr. Clarke, no less than three times, in the passage above extracted from his letter in reply to Sir R. Murchison's temperate remonstrance, mentions his discovery in 1841, and urges that his name should be connected with the question of gold in Australia from that date. But can his casual picking up a bit of quartz containing a penny-weight of gold be entitled to the name of a discovery? Can it for a moment be put in comparison with Sir Roderick Murchison's careful investigation of Count Streleccki's specimens, and his comparison of those specimens with the formations of the Ural Mountains, which he had himself visited, and of which he had written an elaborate account, and from which he drew the conclusion that gold must exist in Australia? I think not. That date, then, to Mr. Clarke's pretensions must be altogether ignored.

What, then, are this gentleman's next grounds of pretension? In 1841 he knew nothing of the history of gold or of gold-producing countries; and, it must be added, that, by his own admission, he never again visited the gold regions of Australia until a considerable time after my discovery; so that he had no opportunity of prosecuting further any personal ob-

servations in the interval. Nor, indeed, does Mr. Clarke inform us when or how soon after 1841 he acquired any addition to his already scanty amount of knowledge of gold formations.

However, passing over what he omits to reveal, let us proceed with what Mr. Clarke does further allege in the matter. He says, in his evidence, that shortly after 1841 he began to speak to several persons "of the abundance of gold likely to be found in Australia," and, among these, he names two, one a Mr. Robinson (since dead), the other Judge Therry.

In 1844, too, he showed a specimen of gold—his pennyweight, I presume,—to the then Governor of New South Wales, Sir George Gipps. But to what does all this amount? And this is the sum total of his own case. To what does it amount but simply to this—that, having accidentally found a little bit of gold, he talked about it, he made much of it, and even ventured on silent prophesyings, somewhat resembling the "*silent mention*" which he made of Sir Roderick Murchison's pretensions! But he never ventured to stake his credit as a geologist—for an able geologist he doubtless is—by publishing his discoveries.

If Mr. Clarke did at that time—at any time between 1841 and 1844—really entertain an idea, based upon scientific deduction, of the existence of gold in Australia, his whole conduct shows that he placed but little reliance on his own discernment, or in the value of the discovery supposed to be made by him. When men make great discoveries in science—even though those discoveries be not sufficiently matured for publication—yet they commonly take care to pre-

serve evidence of those discoveries, and of their own concern in them. And this *one* discovery of gold in Australia,—was it not practically of the weightiest importance as a means of increasing the wealth of the mother country, as well as of the colony? And, viewing the question scientifically—the noblest light in which it can be viewed—is not the discovery of the existence of gold, whether in Australia or elsewhere, by the aids of science, entitled to be viewed as one of the grandest steps that geological science has ever yet taken?

I believe I am right in stating, that, as far as history teaches us, gold, from the earliest ages to the time of its discovery in California, has always been accidental. But, in this case, even before the discoveries in California, Sir Roderick Murchison declared, guided only by the light of science, “I can tell you where gold must be found.” Do Mr. Clarke’s pretensions in any, the smallest degree, approach this point? He finds by accident a bit of gold—he reads about gold countries—he talks of his bit of gold—but he does not show the slightest trace of having made any scientific deduction whatever upon the subject!

Again, when in consequence of the discovery of gold in California, New South Wales was so nearly stripped of her labouring population, that it was in contemplation to prevent the departure of emigrants by legislative enactment, why did not Mr. Clarke make known his theory, however vague or inchoate, to the Government, in order to its being turned to account in an explicit form in so important a crisis? The gold fields that he had himself passed over, in 1841, were within 120 miles of Sydney. It is

idle to suggest, as Mr. Clarke does, that the penal condition of the colony made it advisable to keep the matter a secret ; for immediately on my making known my discoveries to the Colonial Secretary, an adequate reward was promised me, if my story proved to be true ; for at first it was listened to with some incredulity.

On the other hand, if Mr. Clarke, with his established reputation as a geologist—(he had before this, I may observe, been voted a sum of money by the Legislative Council, to assist him in publishing a work on the geology of Australia)—if, I say, Mr. Clarke had taken those steps in New South Wales which Sir R. Murchison had done ineffectually with the Home Government, there cannot be a doubt that he would have had abundance of aid granted him ; and one day's exploration at the gold fields—the very gold fields which he had himself crossed ten years before—would have removed all doubt on the subject.

To resume. I think it must be held as very clear that Mr. Clarke has no pretensions to be considered the scientific discoverer of gold in Australia, but that the honour is due to Sir R. Murchison alone. I think, too, to use the words of Sir Roderick Murchison, that it is due “to the honour of the science which he cultivates,” to award the honour to whom it of right belongs, and not allow it to be transferred to one whose speculations seem, on his own showing, to have been rather a sort of dozing dream, than to have had the life and energy of hearty faith.

Mr. Clarke, however, may console himself with the reflection, that if Sir R. Murchison's claims shall,

by the public verdict, be preferred to his as regards Australia, still New Zealand is open to him, if his apparent habit of tardiness does not make him again too late. Indeed, however, in this quarter he has already sounded the trumpet of preparation for battle with any new claimant; for on hearing of the discovery of available gold fields in that country, he writes:—“*I have long been impressed with the persuasion* that New Zealand must contain a portion of those more ancient formations which in this country are found to be auriferous.”

Dismissing, however, the claims to the honour of the scientific discovery, I now come to give an account of my own practical discoveries of gold in Australia; but, before I enter upon particulars, it is but right that I should notice the actual or reported discoveries of others prior to my own. Of them all I believe it may be truly said, that they were purely accidental.

The earliest rumour we hear on the subject bears date so far back as the year 1788 or 1789, very shortly after the country was first colonised. A convict stated that he had found a piece of gold immediately on the shore by Port Jackson; but a guard being sent with him to the spot, in order to make him verify his statement, he failed to do so, and received 150 lashes as an impostor. Many years later, when the road over the Blue Mountains to Bathurst was being made, several convict labourers are said to have picked up small pieces of the precious metal; but it was thought necessary, for the maintenance of discipline, that a search for it should be discouraged, and therefore any one who professed to

have found any gold was instantly punished. The fact itself (if it be one), however, was kept so secret, that it did not spread abroad until after my discovery. Of its truth, however, I can see no good reason to doubt; because small pieces of quartz, containing gold, have since been found in various parts of these very roads, after descending Mount Victoria. Then we hear of Mr. Clarke having fallen in with a pennyweight of gold in quartz, in the year 1841, already treated of at some length. Subsequently to this, a shepherd named Macgregor, who lived in the Wellington district, seems to have been so fortunate as to find a considerable quantity of gold in quartz rock, which he from time to time took to Sydney, and sold to a jeweller there. He was, however, evidently ignorant of the extent of treasure with which he was surrounded, and was equally ignorant of the character of alluvial gold. But of him I shall have more to say presently. Besides these, a Mr. Smith, in the year 1846, offered the Colonial Government to divulge the existence of a gold mine, if an adequate reward was secured to him. He received the same answer as myself, that he should be rewarded according to the extent and value of the discovery, but with this he was not satisfied. My own persuasion is, that he did not know of any gold fields at all, and that even if he did believe in the existence of gold in any quantities, he knew not how to search for it in alluvial soil; the probability is, that by some means or other he learnt of Macgregor's good fortune in finding lumps of gold in the quartz, and acted on this hint—for on any other supposition it is not credible that, a poor

man as he was, he would have neglected the opportunity of securing an ample fortune, which he could readily have done had he the information he pretended to, by working the gold in the lonely valleys of the Turon, a retired spot where he would run but little risk of being interrupted by his fellow-man in those days.

Prior to this, and to Mr. Clarke's having accidentally met with his pennyweight, Count Streleccki, in the year 1839, made a careful geological examination of the present gold regions. However, though he published a full and accurate account of the general geological formation of the country, and though he collected those very specimens from which Sir R. Murchison drew his conclusions, he does not throughout his whole work speak of Australia as a gold-bearing country. By evidence, however, that has recently come to light, he seems to have been fully aware that the quartz rocks contained gold; but not, as he thought, to an extent likely to bear any commercial value.

The particulars of Mr. Smith's "find" has also to be noticed. This gentleman actually forwarded to the governor a large specimen of gold with an application for a reward for the discovery of a gold field. This specimen was found by accident by a shepherd, and sold to a Mr. Trappet, who sold it to Mr. Smith, by virtue of which he made his application. Without any more knowledge of the subject of gold than simply buying a specimen of that metal third hand, it is not to be wondered at that his application should have failed, as he was, of course, unable to point out the site of his discovery.

To conclude the list, I am informed on undoubted authority that in the year 1830 a piece of gold, several ounces in weight, was found near the Fish River, by a man in the employ of Mr. Low; and this I believe to be an unquestionable fact.

With reference to each and all previous discoveries, therefore, I may observe that they appear to have been purely accidental, and such as in no way to interfere with my claim to have been the first to discover, and to have made known the existence of gold in large quantities in the alluvial soil. Not one of the above fortunate finders of specimens had washed for gold, the ordinary way of procuring it, but had found it unlooked for; or in quartz, and then in minute specks which they thought would bear no commercial value.

To the particulars of my own discovery I now proceed. I have already in a former chapter stated my reasons for believing in the existence of gold fields in New South Wales. It was with an anxious heart, therefore, that I again landed at Sydney, in the month of January, 1851. On my passage thither and immediately on my arrival, I made known to my friends and companions my confident expectations on the subject; one and all, however, derided me, and treated my views and opinions as those of a madman. Still undaunted, on the 5th of February I set out from Sydney on horseback alone to cross the Blue Mountains. On the first day I reached Penrith, a distance of about thirty-three miles on the western road. With the exception of a small patch of whinstone formation, at a place called Prospect, the country was as uninteresting and barren as one would desire to travel through.



On the following morning I resumed my journey, and before five o'clock ascended the pass of the Blue Mountains. These, at a distance, have a grand and imposing appearance, but when one reaches their summits, they become almost insignificant, and are scarcely to be equalled for sterility. The rocks themselves, of which the mountains are formed, rise up almost perpendicularly from low and narrow valleys, presenting a fantastic and striking appearance; but being almost uniformly covered with stunted timber and miserable brushwood, produce anything but a cheerful impression on the lonely traveller, especially if he contrasts it with the scenery of California, all clad in stately pines. Country, such as I have described, continued almost throughout my next day's journey, a distance of forty miles.

After crossing these mountains, I descended into the Vale of Clwyd by the pass known as Sir Thomas Mitchell's, at Mount Victoria, a noble specimen of engineering skill in a country where little else has been done to tame the savage wildness of nature. On arriving at the valley below, you lose the sandstone formation, which, on the way down the pass, alternates with shale, and reach the hypogene formations, leaving the sandstones on the right extending to the left of the Mudgee Road, where they continue for a long distance. Gold may be found here in many places, but not, I believe, in sufficient quantities to remunerate the labourer at the present price of wages in New South Wales.

The country now becomes more inviting and habitable than during the preceding forty miles. Inns had been established at distances varying from ten to

eighteen miles, for the convenience of squatters travelling towards Sydney from the interior ; but, at the time I am speaking of the innkeepers, one and all complained sadly of the poverty of the squatters generally, whom they represented to be so badly off that they could not bear the expense of stopping at their houses, but commonly camped in the bush. I attempted to console one of these complainers, a Mr. Wilson, host of the Blue Mountain inn, by telling him that I had just come from California to make a change in New South Wales, and that he would soon have more customers than he would be able to accommodate. Of course, he only laughed at me. But, on a subsequent visit to the same district, Mr. Wilson happened to recognise me ; and, having found my promise more than fulfilled, set out for my entertainment a lunch of no ordinary character in that part of the country, fed my horses, and resolutely refused to receive any payment—a compliment which the then state of my finances made not unacceptable.

On the third day I reached Bathurst, and resumed my journey on the following morning, purposing first to visit Coombing, the residence of Mr. Icely, M.S.C., to whom I had a letter of introduction, and who had promised to facilitate my views, and render me any assistance in his power. I however met Mr. Icely on his way to Sydney. I then determined to visit Guyong, where I had been eighteen years before, and the neighbourhood of which I believed to be auriferous. I attempted to make a cross cut through the bush, and having travelled about eight or ten miles at nightfall, found myself on the Wellington-road to the west instead of the north. After groping about in the

dark for an hour or two, I found myself at Frederick's Valley, a district which has since become famous for its auriferous wealth. There I spent the night, and on the next day, the 10th of February, reached Guyong.

The landlady of the Guyong inn, Mrs. Lister, had seen better days. I had known her during her husband's lifetime. She was now a widow. It occurred to me that I could not prosecute my plans efficiently without assistance, and that Mrs. Lister was a person in whom I could safely confide, and she would probably furnish me with a guide and all the necessary implements. After dinner, therefore, I disclosed to her the object of my visit, and begged her to procure a black fellow as a guide to the spot I wished to visit first; for though this part of the world was many years back pretty well known to me, it is a matter of no small danger to attempt to penetrate alone the dense forests that cover the whole surrounding country. She entered with a woman's heartiness into my views, and offered me the assistance of her son, a youth of about eighteen years of age, who, she assured me, knew the country well. He was, therefore, made acquainted with my object, and, at my request, provided me with the requisite tools—a small pick, a trowel, and a tin dish for washing the soil.

After resting one day at Guyong, on the 12th of February I started thence, accompanied by young Lister. Our course was down the Lewes Pond Creek, a tributary to the Sumner Hill Creek, which again is a tributary of the Macquarie River. After travelling a distance of about fifteen miles, I found myself

in the country that I was so anxiously longing to behold again. My recollection of it had not deceived me. The resemblance of its formation to that of California could not be doubted or mistaken. I felt myself surrounded by gold; and with tremulous anxiety panted for the moment of trial, when my magician's wand should transform this trackless wilderness into a region of countless wealth.

Still one difficulty seemed to present itself. There had been an unusual drought during the summer, which was now drawing to a close, and the creek, where we then were, was completely dried up. My guide, however, in answer to my inquiries, told me that we should find water lower down; so, following its course, we soon fell in with some rocks which contained a sufficient supply.

We now turned out our horses; and seated ourselves on the turf, as it was necessary to satisfy the cravings of hunger before I ventured on my grand experiment. Had that failed, but little appetite for food would have been left me.

My guide went for water to drink, and, after making a hasty repast, I told him that we were now in the gold fields, and that the gold was under his feet as he went to fetch the water for our dinner. He stared with incredulous amazement, and, on my telling him that I would now find some gold, watched my movements with the most intense interest. My own excitement, probably, was far more intense than his. I took the pick and scratched the gravel off a schistose dyke, which ran across the creek at right angles with its side; and, with the trowel, I dug a panful of earth, which I washed in the water-hole.

The first trial produced a little piece of gold. "Here it is!" I exclaimed; and I then washed five panfuls in succession, obtaining gold from all but one.

No further proof was necessary. To describe my feelings at that eventful moment would be impossible. What I said on the instant—though, I must admit, not warranted as the language of calm reflection—has been since much laughed at. And though my readers may renew the laugh, I shall not hesitate to repeat it, because, as it was the natural and impulsive expression of my overwrought feelings at the moment, so is it the only account I can now give of what those feelings were.

"This," I exclaimed to my guide, "is a memorable day in the history of New South Wales. I shall be a baronet, you will be knighted, and my old horse will be stuffed, put into a glass-case, and sent to the British Museum!"

At that instant I felt myself to be a great man. I was as mad, perhaps, at the moment, as Don Quixote was his life through; and, assuredly, my companion was as simple as Sancho Panza—for the good youth afterwards told me, he expected I should obtain for him the honour I had promised.

On our return that night to the inn at Guyong, I wrote a memorandum of the discovery, which I afterwards gave to the Colonial Secretary, as a memorial of the great event.

More, however, was to be done before I could make public my discovery. It was necessary to ascertain over what extent of country in that district the same formation prevailed, in order to arrive at some notion of the probable extent of the gold fields.

Accordingly, I resolved on visiting the Macquarie river. My guide, not being acquainted with that country, recommended to me a youth by the name of James Tom, to whom, likewise, I was under the necessity of divulging my secret, and making known my first discovery. He, accordingly, took Lister and myself about eighty miles, where we fell in with the Macquarie river.

The country in this neighbourhood was very flat, and no rocks were visible. But we were then in sight of what have since become the extensive Bunandong diggings. The appearance of everything around promised well. We pursued the bed of the river, the stream of which was at the time running very sluggish. It was in many places only a few inches deep; in others were deep holes; and when the banks closed in, the rocks were visible, consisting of compact schists, traversed by quartz veins, threads, and trap-dykes. Here again I satisfied myself of the auriferous character of the country by actual trial, and did so frequently all the way up to the point of my first discovery.

On ascending the table-land from the Macquarie, the Turon mountains became visible in the distance, and, as far as could be discerned, they gave every appearance of being auriferous. After seven or eight days spent in this way we returned to our starting-point, I being fully satisfied that there existed an extent of at least seventy miles of auriferous land in the part of the country I had traversed.

Rumours, however, had been some time prevalent, (and to which I have already alluded), that an old shepherd, named Macgregor, had picked up gold in

the Wellington district, which was at a distance of about 100 miles from the spot where I then was. I therefore despatched my two young companions to examine the Turon, and, providing myself with a fresh horse, bent my course to the house of a friend, Mr. Cruikshank, a squatter, settled at Dubbo, on the Macquarie river, in the neighbourhood of which I knew Mitchell's Creek—which I wished to visit—to be.

I had no hesitation in making known to Mr. Cruikshank the object I had in view. Like others, he listened with incredulity; but his good lady was more sanguine. So, on my asserting that I felt sure we could find gold—fine, probably, and in small quantities—at their very door, we all three started to the river with a tin dish and spade; and, sure enough, the first pan of earth produced gold. Mrs. Cruikshank, naturally, took great interest in the discovery, and, after a few hints from me, set to work with the prospecting-pan, and immediately found gold; encouraged by which, she expressed her intention of resuming her work, and procuring enough to make some rings.

I then proceeded to Mitchell's Creek, under the guidance of a native black fellow, whom Mr. Cruikshank provided for me. It was not difficult to discover where the old shepherd procured his gold, though he had not touched the alluvial soil. I returned by nearly the same route, observing, as I rode along, a good deal of promising country, which has since proved to be very productive, when there is water sufficient to wash the soil.

In the meantime my two former guides, Lister

and James Tom, had returned home, bringing with them some fine gold from the Turon, which, from its character, held out prospects of an abundantly rich field.

My chief anxiety now was lest some miner from California should make a similar discovery, and forestal me with the Government. I therefore determined to proceed at once to Sydney, and put myself in communication with the Colonial Secretary. Before starting, however, I instructed my guides how to make a proper cradle, and in the mode of using it. In about four days I reached Sydney, and put myself in communication with Mr. E. Deas Thomson, the Colonial Secretary; told him I had discovered an extensive gold field, and showed him some fine gold, the produce of the country.

Mr. Thomson evidently doubted the truth of my story, and remarked that it was very strange the Government geologist had not found it, if it existed in natural deposit, as I represented. I told him I had come from California for the purpose of making the discovery, and there it was. I added, that I believed the fields to be as rich as those of California; but that I expected to be rewarded for the discovery in a measure commensurate with its importance to the Government and the country at large.

By this gentleman's advice, I called upon him the next day, when, after a lengthened interview, he requested me to communicate with him in writing, and state the terms on which I was willing to point out the gold fields. He added, "If this is a gold country, Mr. Hargraves, it will stop the Home Government from sending us any more convicts, and prevent



emigration to California ; but it comes on us like a clap of thunder, and we are scarcely prepared to credit it."

On the following day I addressed the following letter to Mr. Thomson :—

No. 1.

*Copy of a Letter from Mr. E. H. Hargraves, to the Colonial Secretary :—*

"Sydney, 3rd April, 1851.

"SIR,—With reference to my interviews with you respecting the discoveries recently made by me of the existence of gold on Crown lands in the interior of this country, and to your suggestion that I should communicate to you my views in the matter, I beg leave to state that I embarked in the discovery at my own expense, as a means of bettering my fortunes in the event of my search proving successful. I have succeeded beyond my expectations ; and, so far, the great hardships, expenses, and exercise of my skill have been rewarded ; and, further, that within the period of my explorations (the last two months), I made very satisfactory discoveries of the existence of the precious metal in several localities on the Crown lands above referred to, and that my first discovery was made on the 12th of February last.

"I have now the honour to submit, for the early consideration of the Government, the following propositions—viz., That if it should please the Government to award to me, in the first instance, the sum of £500 as a compensation, I would point out the localities to any officer or officers they may appoint, and would undertake to realise to the Government my representations, and would leave it to the generosity of the Government, after the importance of

my discoveries and disclosures have been ascertained to make me an additional reward commensurate with the benefit likely to accrue to the Government and the country.

"Requesting the honour of an early answer, addressed to me, East Gosford, Brisbane Water,

"I have the honour to be, Sir,

"Your most obedient servant,

"EDWARD H. HARGRAVES.

"To the Honourable the Colonial Secretary."

No. 2.

*Copy of a Letter from the Colonial Secretary to Mr. E. H. Hargraves:—*

"Colonial Secretary's Office, Sydney, 15th April, 1851.

"SIR,—In reply to your letter of the 3rd instant, I am directed by the governor to inform you that his Excellency cannot say more at present, than that the remuneration for the discovery of gold on Crown land, referred to by you, must entirely depend upon its nature and value when made known, and be left to the liberal consideration which the Government would be disposed to give it.

"I have the honor to be, Sir,

"Your most obedient servant,

"E. DEAS THOMSON.

"Mr. E. H. Hargraves, East Gosford,

"Brisbane Water."

Having accepted the terms proposed to me, and entered into an agreement with the Colonial Government, and having received my final instructions, I was anxious to draw public attention to my discovery, and induce as many persons as possible to set about digging for the precious metal. To this end I proceeded at once

to Bathurst, and everywhere, as I went along, I made known the fact of my discovery. From Bathurst I proceeded to meet Mr. Stutchbury, the Government geologist, and went with him, accompanied by about thirty-seven horsemen, to Sumner Hill Creek, at the junction with Lewes Ponds, a little below my first discovery.

At this spot we found the young man Tom and his brother at work. I washed several pans of earth in Mr. Stutchbury's presence, as also some in the cradle, and fully satisfied him of the truth of my statements; and, on the spot, he gave me a certificate to that effect, to be forwarded to the Colonial Secretary. Before leaving, I gave several new comers instructions in the method of washing and using the cradles, and, by the end of the week I should think about £10,000 worth of gold had been raised on the spot; to which I had previously given the name of Ophir.

It had never been my intention, in connection with this discovery, to work for gold; my only desire was to make the discovery, and rely on the Government and the country for my reward. Many thought me very foolish in this respect, and some made me most liberal offers for my services, if I would point out claims, superintend working-parties, and buy gold on commission; but I resolutely refused every offer, and resolved, from first to last, not only not to accept any private remuneration, but not even to appropriate a grain to my own use.

When those who were working in the mines seemed to be sufficiently acquainted with the method of working, I returned to Sydney, and, on my arrival

there, found a proclamation had been issued, declaring that all gold found in natural deposit was the property of the Crown, and that all persons found digging for it would be visited with sundry pains and penalties. I had, on my first interview, recommended the Colonial Secretary to adopt a system of licensing, similar to that at first pursued in California, with regulations for working. This suggestion was adopted. Of the regulations themselves, which were made at various times, I shall speak on another occasion.

At an interview that I shortly afterwards had with the Governor, his Excellency offered me the appointment of Commissioners of Crown Lands, at the usual pay of 20s. per diem. But this I at first declined, on the ground that such a salary would be quite inadequate in a gold country. However, on being assured that, by accepting the office, I should increase my claims to reward for the discovery, I felt bound to accept it; and, accordingly, started once more with one servant and a pack-horse for the land of Ophir, my business being to search for new gold-fields.

When about two miles from Sydney I met with a member of the Legislative Council, who begged me to retrace my steps, assuring me that I should lose my life if I ventured to proceed; for that there were hundreds of unsuccessful diggers not far in advance, on their return from the diggings, who declared that I had deceived them, and that they would put me to death.

Nevertheless, I proceeded on my way, and certainly met many returning from the mines. For-

unately I was not known to any of them. I accosted many of them in passing, but was shocked to hear at times the most horrid imprecations levelled against what they called the "curse of God," a man "who had brought them across the mountains in search of gold." In answer to my inquiries, one said that there was a little gold, but that it was all dug out; he had lost four pounds sixteen shillings, and had not got gold to the value of a farthing, besides having to cross and recross the mountains: another had lost fifteen pounds, another twenty pounds, and another thirty pounds.

But it would be in vain for me to attempt to describe all that I witnessed at this particular juncture. Among other strange sights, I saw a blind man led by a lame one, trudging across the mountains *en route* for the gold fields. They solicited charity. The lame man was hopping on crutches, and the blind man had hold of his right hand, which was extended over the crutch. Thousands who started from Sydney never reached half way, and, seeing as many coming back as going, those upward bound got discouraged, and returned in despair, vowing vengeance against the man who had so deceived them.

On reaching the horse-ferry over the Nepean River, at Penrith, I fell in with a strong party of the disaffected waiting to come over. I could hear their threats as I crossed, and, thinking this a good opportunity to remonstrate with them with safety, resolved to do so. Accordingly, on reaching the opposite side of the river, I remounted my horse, and then making myself known to them, blamed them for want of perseve-

rance, and declared that their carts would not suffice to carry away one-hundredth part of the gold they had left behind them. But all was of no avail. Some proposed to drown me on the spot; and as a party approached me, apparently with no friendly intentions, I thought it prudent to put spurs to my horse and get out of their way.

On nearing the mines for the third time, I found a great many sorely dissatisfied. But they had deceived themselves; their imaginations had been wrought up to the highest pitch of excitement on their journey upwards; they expected to pick up gold by the handful, not reflecting that labour is the lot of man, and that what could be obtained so easily and so abundantly, as they hoped, could in the end be of little real value. Those who persevered, however, soon came to a better mind. Hard labour produced sound sleep; and, after that, the reasoning faculties resumed their proper sway. The sick at heart were willing to receive advice and encouragement; and though, doubtless, many were unsuccessful, yet thousands upon thousands realised large fortunes; which some squandered in intemperance, and some wisely invested in the purchase of houses or land.

Before leaving Sydney, I had received instructions from the Government to proceed immediately to Wellington, for the purpose of examining and reporting on a most important discovery of gold, alleged to have been made in that neighbourhood, in the matrix or parent rock. The exact locality was to be pointed out to me by Mr. Brockstayn, a jeweller, with whom I was desired forthwith to put myself in communication.

I believed, and expressed my belief to the Colonial Secretary, that the supposed discovery was a mere delusion. I had already seen Mr. Brockstajn, who told me a most marvellous story, and stated that ladders would be required to ascend the rocks where the gold was to be obtained. I well knew that there were no such rocks at Mitchell's Creek as would require the aid of ladders; but my objections were only met by a peremptory order to obey instructions and make my report.

In the month of June I accordingly met Mr. Brockstajn at Wellington, and at once proceeded with him to Mitchell's Creek, a distance of about ten miles. It would require the pen of a Congreve, and the imitative powers of a Mathews, to re-enact the ludicrous scene that occurred between us on our reaching our destination.

On my asking my companion to what part of the creek he wished to go, he replied :

"Vell, I dosh not know ; me not come here before to-day."

"What," said I, "haven't you been here before to-day?"

"No," said he. "You knew," said he, "dish isht de vay it wosht—Macgregor got de gold long times ago, ten twelve years ago, and sell te von Mr. Cohen. Mr. Cohen ish dead, and I marry de widder. Now, Mrs. Brockstajn vosht von time, you see, Mrs. Cohen; vell, den, my vyfe, you see, ven ve vosht married, tells me all about it—dis vay you see—dat Macgregor ten twelve years ago, every time him comes te Sydney vid de sheeps, dat isht vounce a-year, always bringeht de gold and sells it you see to Mishter Cohen. Mishter

Cohen sells two three pieces to Sir Thomas Mitchell, and Mishter Clarke the gemgeligist buy some too. Vell, ven you find de gold I tink I get good reward. You know Isht vun very poor man, and you makes vun goodsht report. Isht not forget you; me got goot many little poys you see; Isht very poor."

It would be impossible to describe my disgust at having been brought upwards of 100 miles out of my route on such an errand. I had been at Mitchell's Creek in February, shortly after my first discovery, and had heard, on my way up, of Macgregor having found gold there. I knew he had obtained it from a quartz vein, for Sir Thomas Mitchell told me he had bought such a piece from Mr. Cohen in his lifetime. Mr. Brockstaysn showed me a similar specimen of gold in quartz which his wife had given him.

However, I had no help for it, but must do the bidding of my blind guide, who persisted in his story, saying, "I am shure dere isht gold in de place, what for my vyfe tells me dats de place vere Macgregor gets isht gold, and you can find it if you like."

I requested him to show me the place where the ladders were required, and I would at once climb the rocks and knock off as much quartz as would fill the gig in which we had ridden to the spot; but he had endless stories, and could say no more about it. My first wish was to leave him where he was, to find his way back to Wellington as best he could; but, fearing he might lose himself in the bush, I reluctantly took him back to the place whence we had started.

While at Wellington, I received instructions to proceed to the Abercrombie river and report upon a discovery made there. On my way through the



mountains I was much struck with the promising appearance of the country; it has not, however, hitherto proved so productive of gold as it appeared likely to be, though, I doubt not, when it has been more thoroughly examined, it will be worth the labour and cost of digging.

On arriving at the Abercrombie river, I found about thirty persons at work. Most of them had come from Goulbourn, about 125 miles south of Sydney. They were novices in gold digging, and were, in some cases, losing more than half the gold. I, therefore, taught them the proper mode of working, and suggested some alteration in the construction of their cradles. I gave the name of Tarshish to the diggings: who first discovered them I cannot call to mind. Mines spreading at various intervals, over an extent of 1,000 miles, were almost simultaneously discovered; for, in addition to some hundreds whom I had instructed at Ophir (the fields first discovered), in the method of searching for gold, and in the character of country in which it should be searched for, great numbers of experienced miners returned from California on receiving news of the first discovery.

Having reported on these diggings, I was ordered to proceed to Araluen, near Braidwood, and report on a gold field discovered there, in a country of granite formation. I, however, found the usual constants, schists, quartz, and trap in conjunction with the granite. Some 300 persons were at work.

The man who first found the diggings was pointed out to me. He told me that he had been induced to make a search for gold in that spot, because he saw swamp oaks growing in the bed of the creek, similar

to those he had seen at Ophir, where he had worked successfully for a short time. It is hardly necessary to say that particular kinds of timber afford no indication of an auriferous country, for almost all the various kinds that grow in the colony are common to the gold fields.

I found, at this place, gold in fragments of granite, and in the granite boulders, which had the appearance of being cemented together by some mineral substance, formerly held in solution in the water which had transported them to their present resting-places. I had never before seen diggings of this kind—that is, with so much granite and so little slate and quartz. There were also remarkable quantities of ironstone, having the appearance of honey-comb, which, I presume, were portions of much larger masses, or probably veins. I believe this ironstone to be auriferous, though I was unable to detect any gold in it with a common magnifying-glass. The gold was obtained from a granite *detritus*, from one foot to ten or twelve below the surface. The upper soil was frequently of the richest description, altogether different to the sterile region of the Bathurst diggings.

The Araluen diggings are situated about eight miles from Braidwood. I estimated the produce of gold at from 10s. to 20s. per day; and, after a very extensive working, such has proved to be about the average.

I followed the Araluen Creek to the Morouya River, and the course of that river to the sea, a distance of fifty miles. There was gold very near the sea; but I was unable to report favourably of the Morouya, and although many trials have been

made along its banks, it has not rewarded the diggers sufficiently to induce them to continue in that locality. In time to come, it will, doubtless, be thought worthy of attention, as will many hundreds of spots which I have prospected, but have not made generally known.

From Araluen I crossed the range into the Jingera and Tindary mountains, which in some places looked very promising ; but the country was a complete bog. I therefore returned by way of Braidwood and Goulbourn, and went to the Tumut River, near Gundagai. I did not find any gold there, although I have no doubt it exists in small quantities. The country, however, did not appear to me to invite a laborious search.

I found some gold in the Nackey Nackey Creek, which is near the Tumut, but not in sufficient quantity to deserve particular notice. On Adelong Creek, a little farther to the south, gold has been worked for, but not with very good success. However, I did not visit Adelong at this time. The Tumut and Upper Munahidgee present a fine agricultural and pastoral country, and is much occupied by squatters.

I had now examined such portions of the country as I had been desired to do, and once more bent my steps towards Sydney, from which I was distant about 300 miles. I reached my destination about the 15th of December, 1851.

I next received instructions to visit Moreton Bay, about 500 miles north of Sydney, with the view of ascertaining to what extent New England was auriferous, and to report on a reputed gold field at the Hanging Rock ; and upon another at Lord John's

Swamp, on or near the Darling Downs. I started on this mission on the 7th of February, 1852.

I had already travelled through a considerable part of this country, that is to say, as far as Gloucester, on the Australian Agricultural Company's estate. Knowing it to be throughout of sandstone formation, I did not institute a search for gold until I passed that point, and came to the hypogene formations, which exist at the head of the Manning River, where I crossed, and found gold. Thence I took a direct course through the mountains, crossing the Bernard, and ascending the favourite table-land of New England, near the Hanging Rock. There I found from 80 to 100 persons at work in a small mountain stream, called Oakey Creek. Their earnings appeared not to exceed 8s. a-day on an average, although some succeeded in making as much as 20s. to 30s.

Here again I found the diggers very imperfectly acquainted with the business, and therefore put them in the right way of working properly. On examination I found the auriferous region here extended about seventy miles in circumference ; and although I believed it would pay moderately, it did not appear to me to be so rich as many others I had seen. And so it has proved hitherto ; for no large quantities have ever been obtained from it, though those who were satisfied with moderate remuneration of from 10s. to 15s. a-day have almost invariably met the reward of their labours.

Having explored this country, I next proceeded towards the Macdonald River, where I found gold in moderate quantities. The country was chiefly granite,

and indeed almost everywhere throughout New England gold could be obtained in small quantities.

The whole district is admirably adapted for agriculture; and, having abundance of excellent water, which is a rarity in many parts of Australia, will doubtless hereafter be thickly peopled, though it is now almost entirely occupied by squatters, with their numerous flocks and herds.

On descending the mountains near Lord John's Swamp, I crossed a few slaty ranges, containing a very small quantity of quartz. Some gold could be obtained there, but I saw nothing that deserved the name of a gold field. Thence I went on to the Condamine River, crossed the downs to Drayton, and so to Brisbane by Cunningham's Gap; but, during this part of my journey, saw no signs of an auriferous country. On the summit of the dividing range there is a good deal of trap-formation, and the spurs eastward are generally whinstone. As the eastern waters intersect this country, no doubt small quantities of gold will be found if diligently searched for, though the eastern slope itself is not auriferous. I may here observe, that Mr. Stutchbury and Mr. Clarke have since examined this district, and after vast labour have come to the same conclusion.

In June, 1852, I returned to Sydney. In the meantime the news received from the neighbouring colony of Victoria was most astounding. I had stated my belief that the whole cordillera of Australia would prove, in a greater or less degree, auriferous; but certainly never dreamed of the wonderful discoveries so shortly to be made there, which so completely threw the New South Wales diggings into the shade.

The auriferous wealth of New South Wales I believe to be boundless, and much more equally distributed than that in Victoria; but it requires a large population to develop it adequately: whereas, the gold fields of Victoria are fewer and less continuous, but so enormously productive at particular spots that the hope of acquiring a rapid fortune will for a long time to come hold out attractions to the gold-seeker greater here than in the more extensive and widely-spread fields of the sister colony.

Being naturally desirous of seeing the gold fields of Victoria, I obtained the governor's permission to visit them, and once more set out from Sydney in the early part of July, 1852.

My mode of travelling through the wilds of Australia may not be without its interest in this country, where the traveller enjoys almost all the comforts and conveniences of his own fireside. I had hitherto taken one servant and three horses; I rode one horse, my servant another, and the third carried a small tent and three weeks' provisions, consisting of flour, tea, sugar, and salt beef, together with cooking utensils, a spade, shovel, pickaxe, prospecting-pans, and a small cradle. Wherever water and grass were to be found, there was a home ready for immediate occupation, whether in the mountain or in the valley or plain. In this way I could travel about twenty miles a-day. My servant carried a carbine, which was useful for shooting ducks. On the occasion of my journey to Victoria, however, I for the first time indulged in the luxury of a light covered spring-cart and a mattress, and was attended by two servants instead of one.

I reached Goulbourn about the middle of July; but

was detained by heavy rains for nearly a month, and even when it was possible to move forwards it was a difficult matter to advance even a few miles daily. By the end of the month I reached Gundagai, which had recently been the scene of one of the most disastrous floods that ever visited New South Wales.

Gundagai is situated on the Murrumbidgee River, distant about 250 miles from Sydney. The town was built on the river flat, and though in former years the river had risen to a perilous height, and though there was a tradition prevalent amongst the native blacks of its having grown (as they expressed it), quickly like a sea, yet the low grounds by the river were fixed upon as the site for the town, in preference to the adjoining high lands, which form a gradual slope to the plain below.

To return to the calamity I have just spoken of; the river, during the early part of the winter, had been rising for a day or two; but little uneasiness was felt, until one day, towards night, when the water increased so rapidly as to induce many persons to seek refuge on the high land. Others, however, considered themselves secure, and would not move; when suddenly a torrent of water came pouring down the valley of the Murrumbidgee and swept away all before it,—horses, cattle, and no fewer than eighty-three of the inhabitants, who perished in the flood. When I crossed it in August, the flood had subsided, though the river was still swollen; so much so that I had to move my provisions into a boat and swim the cart and horse across.

I was glad to turn my back on this scene of desolation, and after having advanced about two miles

on the south side of the river, encamped there for a few days to rest my horses. I then proceeded towards the River Murray, which forms the boundary between the colonies of New South Wales and Victoria. On the New South Wales side, a few miles from the river, the country promises fairly for a gold field; and such, I doubt not, it will hereafter prove to be. Along the line of the river, on both sides, is one of the finest wheat-growing countries in the world, producing grain that weighed sixty-six pounds to the bushel.

After crossing the Murray, I proceeded to the Queen's diggings, as they are called, a distance of about thirty-six miles. They were discovered in July, 1852, and are situated to the left of the main road to Wangaratta, at the heads of Read's Creek and its tributaries. Read's Creek is a tributary of the Queen's River. When I was there the principal diggings were on Spring Creek.

I found some hundreds were at work, with average success. The gold there is very fine, and found in a blue clay underlying beds of shingle, at an average depth of eight feet. I have taken a handful of this clay, weighing about one pound, which has produced about half an ounce of fine gold. Some parties were very fortunate; one in particular got a hundred weight of gold out of a claim or two not more than five feet deep.

The Spring Creek formation consists of granite, with a *detritus* of quartz, trap, slate, and granite, overlying it. At the head of the creek there is a formation of schists and quartz. I observed also basaltic whinstone. I have no doubt that the gold will be



found to extend almost the whole way to Melbourne, along the spurs of the ranges at the head of the Goulbourn river.

After leaving Read's Creek, the country becomes low, scrubby, and uninviting, until you reach the flat land of the Ovens, which is a fine open box country, with the river banks of very rich soil. Wangaratta is the post-town, about twenty-five miles distant from the Spring Creek diggings and 200 miles from Melbourne.

At Kilmore, a town on the direct line from Sydney to Melbourne, and distant from the latter place about forty miles, I turned off to the left towards Bendigo. The Bendigo diggings were for a considerable period very extensively and profitably worked; the number of persons engaged there at one time being estimated at no fewer than 25,000. In one part of them a new feature presented itself. This was at a spot called the White Hills, situated on the north side of Bendigo Creek.

These hills are covered with small quartz, ironstone, and fragmentary slate; almost immediately below the surface, there is a conglomerate as hard as stone, which is pierced through with very great labour at various depths, from five to twenty-five feet. The auriferous matter is in concrete substance, immediately above the ledge, which appears to be a substance resembling chalk, and occasionally pipe-clay, although it is clear it can neither be the one nor the other. The mode of working is to sink some five feet through this substance, and work the roof with gads and a hammer. Some loads carefully taken off, I was informed, on good authority, yielded five pounds weight of gold; there being fifty buckets to the load.

From Bendigo I proceeded to Mount Alexander, a distance of about thirty miles. These diggings are about nine miles in diameter, and comprise Forest Creek, Fryer's, Barker's, and Campbell's; Moor Poak Gully; and the usual number of digger's names for flats, hills, and gullies. Forest Creek and Fryer's Creek present remarkable striking indications of a rich auriferous region. The others present no feature requiring particular notice.

From this quarter I proceeded to Ballarat, a distance of about sixty miles. The approach to it is a slight descent, presenting numerous trap-dykes and granular quartz in immense quantities; in many places for several feet deep there is nothing else but quartz.

Here are the Eureka diggings, which are from thirty to seventy-five feet deep; some of them have proved surpassingly rich. The sinking is through a loamy clay. The gold is deposited on the slate. A little nearer the camp at Ballarat, on the same range, the gold is on the surface, at an elevation of about one hundred feet; then comes the flat and the celebrated Golden Point. This spot has proved very rich, and is where the first washings in Victoria were commenced in good earnest.

The sinking is through a red clay, and the gold as at Bendigo, is found on the ledge. These diggings possess a great natural advantage over any other in all Australia, in having, at an elevation of about sixty feet above the level of Golden Point, and distant about half a-mile, a lagoon or swamp ten miles in diameter where an abundant supply of water can always be had, and the required quantity can be regulated by means of flood-gates. I therefore consider this locality

to be the most permanently settled as a mining district.

Having thus visited the principal gold fields throughout Australia—I mean such as at that time were being worked—I bent my course towards Melbourne, and thence returned by sea to Sydney. It now only remained for me to await the reward promised by the Colonial Government for my discovery, and resign office as Commissioner of Crown Lands; for it was determined that on receipt of the former I should vacate the latter.

The Legislative Council of New South Wales awarded me the sum of £10,000, deducting, by way of discount, the £500 I first received; an amount of compensation which I by no means complain of. But I must say that I made a very bad bargain when I consented to leave the amount of reward to the discretion of that body. For I hardly think that, had I stipulated for the apparently small per centage of 10s. on every £100 value of gold exported from Australia, for the period of three years from my first discovery, it would have been considered unreasonable. Indeed, I believe this remuneration would have been considered very moderate; yet that per centage on the exports for those three years, estimated to amount to £50,000,000, would have produced no less a sum than £250,000.

## CHAPTER V.

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**THE VARIOUS METHODS OF WORKING FOR GOLD, ANCIENT  
AND MODERN ; AND THEORY OF ITS ORIGIN.**

Account of Pliny—Gold-digging and Gold-washing in Thrace—Herodotus' amount of gold dust in India—Pliny speaks of three sources of gold—Gold mines in Spain upon a grand scale—Modern practice in various parts of the world—Up to the present time the greatest bulk of gold has been obtained from alluvial lands, by washing—This is, and must continue to be, the most usual practice—How far quartz crushing may be made remunerative—Pan-washing, or "Prospecting," as employed in California and Australia, in South America, and the African coast—Various methods of gold washing—The cradle; Long Tom; The puddling or dolly tub; and the sluice—Gold washing in Hungary—In Brazil—In the Ural Mountains—Of the separation of gold from the matrix by chemical means—Delusions on this subject—The quicksilver machine has been successfully used in some places—The machine described—The quartz matrix theory investigated and disputed—The author's theory on the subject—A few words on quartz-crushing machines.

I PROPOSE in the present chapter to give as clear and succinct an account as my own observations and experience, and the sources of information to which I have had access will enable me to do, of the various methods employed, both in ancient and modern times, for the separation of gold from the soil or rock in which it is deposited.

Of the methods adopted by the ancients, we have, I

believe, no precise accounts prior to the time of Pliny, who was born A.D. 33. Still, some slight information may be gathered from incidental notices or expressions, which enable us to conclude that they procured gold as well from the rock as from the alluvial soil. As to the plan of quartz-crushing, we are informed—and, doubtless, on sufficient authority—in Dr. Smith's "Dictionary of Greek and Roman Antiquities," that the method the ancients adopted for separating the gold from the quartz, was by first grinding and then baking it, by which process they succeeded in getting it very pure. That the more ordinary method of digging and washing for gold was also practised in those early times, cannot be doubted. Indeed, it is distinctly inferred, by the fact that the gold mines on the banks of the river Steymon—which anciently formed the boundary between Macedonia and Thrace, and of which mention was made in a former chapter—are called by the name of "diggings." Doubtless, the gold from the river Pactolus, and the streams in the same regions, was obtained by washing. We have, indeed, no account of the method in which it was obtained, but it is always described as "dust."

But the most marvellous story is that told by the historian Herodotus, wherein he describes how those Indians, who had to pay King Darius a million and a quarter of our money in gold dust, as an annual tribute, procured their gold. Recent discoveries have so frequently verified the accuracy of that historian on points where, for 2,000 years, he had been supposed to have written fiction rather than fact, that, wherever he speaks positively, I should be very loth

to give a direct denial to his statements. Added to which, his account is referred to as true by a later and unquestioned writer of ancient times, already referred to by name—Pliny—whose description of the method of working for gold I shall presently quote.

The gold dust, then, Herodotus tells us, was procured in the following manner:—Far to the east of India, and bordering on China, was a vast desert of sand, mixed with gold. In this desert and in the sand there were ants, he says, somewhat *less* than dogs, but larger than foxes. With respect to the word *ants*, it may be observed, that it is the translation of the Greek word used by the historian, though some suppose the animal to have been a species of dog—the *Canis Corsak* of Linnæus. Whatever they were, however, these ants formed their habitations underground, and heaped up the sand in the same manner as the ants in Greece do. The Indians, to procure the gold, used to go to the desert to procure this sand, each man having with him three camels—a male camel harnessed to draw on each side, and a female in the middle. The man rode on the female, having taken care to select one that had been separated from her young as recently born as possible. They contrived to reach the ant hills at the hottest part of the day, when the ants are in the habit of taking shelter underground; and, immediately filling their sacks with the sand, make their escape as quickly as possible. The reason for this, as the story goes, is, that the ants, immediately discovering the camels by the scent, would pursue them, and so swiftly, that if the Indians did not get the start of them while the ants were assembling, not a man of

them could be saved. And now is seen the wisdom of taking the female camel for the chief draught, for the males would grow tired and slacken their pace, whilst the female, out of love for her young, would press forward towards home. Thus the Indians obtained the greatest part of their gold. They had also some small quantity which was dug up in the country, and some brought down by the rivers.

Pliny's account is still more clear and interesting. He tells us that gold is procured from three different sources:—First, it is found in our world, he says, by ants (thus, as will be observed, referring to, and, in some measure confirming, the account of the Greek historian); secondly, in the sands of rivers; thirdly, in wells or mines, or in the ruins of mountains. He then proceeds to speak both of the methods of digging and of mining, properly so called. His account is so curious, that I think it better to give a translation of the author's words:—"The gold-seekers," he says, "first of all take off the *segullum*"—that is, the surface soil, which indicates the presence of gold. "This is put into a cradle or channel, the sand is washed, and an opinion is formed from the sediment that remains. Sometimes, by rare good fortune, it is found on the surface—as recently, in Dalmatia, during the reign of Nero, when it produced as much as fifty pounds' weight daily.

"But the arid and sterile mountains of Spain are compelled to be productive, being dug in shafts and pits. In such cases the veins run along the sides of the pits, and the soil is propped up with columns of wood. What is dug out is beaten, washed, burnt, ground into meal, and pounded with pestles.

“The third method,” he continues, “surpasses the labours of giants. The mountains are hollowed out through long spaces, by the light of lamps—the workmen do not see daylight for many months. These are called gold mines. The sides fall in suddenly, and overwhelm the workmen; so that now it seems less hazardous to search for pearls in the bottom of the sea, so much more guilty have we made the earth.

“In both methods of operation flint stones are met with: these they break with fire and acid. But oftentimes, as the vapour and smoke cause suffocation, they break the metal by striking, often bringing down pieces 150lbs. in weight: these are carried on men’s shoulders day and night, each one passing them on to another placed in relay: the last only see the light.” He adds—

“They assail the metal with iron wedges and mallets, and think nothing in the world is harder—except only that the greediness for gold is the hardest thing of all. When the work is finished, the ceiling is at last beaten in. Its fall gives the signal, and the watchman at the top of the mountain alone perceives it. He orders the workmen to be called off, and, at the same time, makes his own escape. The broken mountain falls forward with a crash that the human mind cannot conceive. The victors behold the ruin of nature.” And here, it may be observed, that though we have no account of the method in which the Greek mines were worked, yet Herodotus informs us, that in the island of Tharsos, which is situated near that part of the continent where the Thracian diggings were, “A large mountain has been thrown upside down in the search for gold.”



To return to Pliny, he continues: "Another task of even greater costliness is that of conveying streams of water, even 100 miles in length, to wash this rain on the top of the mountains. These they call canals; and the labour consists in this, that the water must be conveyed to a height from whence it may force its passage in; accordingly it is carried to the greatest possible heights. Dykes are hollowed out below for the water to flow into; these are strewn with a shrub called ulex, or rosemary, which is rough and retains the gold. This ulex is afterwards burnt, and its ashes are washed in order that the gold may form a deposit. Twenty thousand pounds weight of gold yearly are said to have been procured in this manner, in Asturia, Gallæcia, and Lusitania; Asturia producing the largest quantity, there being no mines in the world equally productive."

These, indeed, were works far grander in conception than any in modern times; though probably falling short in practice of modern efforts in the application of some science to art: they were works altogether in keeping with the stupendous efforts which the later Romans displayed in the construction of roads, bridges, aqueducts, and other buildings, wherever their arms extended—from their utmost eastern limits to the wall that formed a boundary between Ancient Britain and Caledonia.

I now proceed to describe the various, more recent, and the present methods of procuring the gold. In doing this, it will not be convenient to treat the subject either in the order of the dates, or with reference simply to the various countries where the different methods are in use; both these arbitrary

modes of dividing the subject must give way to the less complicated plan of beginning with the most simple modes of operation, and proceeding gradually to the more difficult ones. But even according to this method a varied classification might be adopted; as, first, into mere hand-washing and washing by machinery; another line of distinction might be made between the various methods of washing and amalgamation; and a third division might be made with reference to the different sources whence the metal is obtained, as from alluvial soil or the solid rock. However, a careful consideration of my subject induces me not to adhere closely to any one of these plans of treating it, but rather to be guided entirely by the nature of the various processes, beginning with that most easy.

“Up to the present time,” as Dr. Ure has observed, “almost all the gold brought into the market has come from alluvial lands, and has been extracted by washing.” And this method is still practised, and must continue to be practised, by the tens of thousands of private gold-diggers who throng the various gold-fields of California and Australia. It remains yet to be seen how far quartz-crushing will be remunerative. There is, indeed, every prospect, owing to the vast improvements recently made, and every day making in machinery, that a wide field may one day be opened for the profitable investment of capital in quartz-crushing by machinery; nevertheless, as such a mode of operating must ever be beyond the reach of private enterprise, the established methods of soil-washing, with such improvements as may be suggested in them, must

continue to deserve as much consideration as ever. It must be obvious that so long as alluvial soil is to be found containing gold, and so long as the ordinary labourer can earn from 10s. to 20s. a day in washing for it—a larger reward than his ordinary wages at any other employment—so long will thousands continue, as they do now, to pursue gold-digging as their means of livelihood; not to take into account the constantly-nourished hope of one day realising, what to such persons would be a small fortune, in the shape of a massive lump of gold.

To proceed, then, to the most simple method of procuring gold from alluvial deposit. In California and Australia it is called pan-washing, or prospecting. The prospecting-pan is generally made of tin, of a round shape, about four inches deep, and nine inches broad in the diameter at the bottom, and fifteen at the top. In the process of washing, the pan is nearly filled with soil, and then dipped into water. The soil is then carefully mixed up with the hands. During this process, a great deal of the earth floats away in solution. The pan is then immersed a second time, and is immediately worked in a rotatory manner—skill in which can only be acquired by practice. By this process the stones are brought to the top, when they are taken out with the hand and thrown away. By this time the operator has got rid of half the contents of the pan; and immerses it a third time, and oftener if necessary. The whole principle of the process depends upon the simple laws of gravitation; so that it will be obvious, that if the gold is very light and scaly, some portion of it may be lost, by passing away with the soil in solution.

to prevent which occurring much care and some skill are required. As the process approaches completion, the great object is to concentrate the gold as much as possible; and this is done by a peculiar shake of the pan, by which the gold is forced to the bottom, and the remaining soil carried off. By a practised hand, the whole operation is gone through more quickly than it can be described. At length, nothing remains in the pan but gold and emery. The latter is separated from the gold in a similar manner to that already described; but great care is required, if the gold is fine, to prevent any of it from passing away with the emery. To wash expertly requires great practice, and but very few do it properly. As I mentioned in a former chapter, my coadjutors and I had recourse to it at the outset, when we were afraid to spend too much of our little capital in the purchase of a cradle. It is not, however, often used as a permanent plan, though expertness in it is essential; for it is the most sure and expeditious plan of searching for and discovering new gold fields.

Were my remarks confined to the methods of working in use only in Australia and California, I should now commence to explain the next most simple process, that of cradle-washing; but as I wish to notice, as far as lies in my power, the various modes practised in all parts of the world, I must here observe that in some parts of South America, where hand-washing is extensively practised, the instrument employed, instead of being broad at the bottom, is round and brought to a point—that is to say, cone-shaped. In other respects, the mode of separating the lighter and stony matter from the

metal is the same as that above-described ; but as far as my experience extends, I should think that more gold would be lost owing to the gradual inclination of the sides from the lip of the pan to the bottom. Probably, also, the gold is not washed so clean as with us, for it is usually separated from the residuum by amalgamation.

A similar process is in use on the gold coast of Africa. There the gold is found on the sea-shore. In the morning succeeding a rainy night numbers of the natives go to the sea-shore, each furnished with two calabashes, one of which they fill with earth and sand. This they wash with many waters, by turning the calabash round ; the water, with the lightest of the mud, washes over the brim, while the gold, if there be any, sinks by its own weight to the bottom. Thus they continue until two or three spoonfuls only remain, and this they put into the other calabash ; they then fill the first calabash again, and continue washing until about noon, when the calabash that receives the settlings being pretty well filled, is taken home and minutely searched.

My authority for this mode of washing adds—  
 “ They sometimes find as much gold as is worth half a guinea, sometimes to the value of a shilling, and sometimes none at all.”

I now proceed to speak of several modes of washing prevalent in California and Australia, those in fact which are generally in use, but which require the labour of more than one person ; such as with the cradle, the long-tom, the puddling or dolly-tub, and the sluice.

For the cradle, so many thousands of them have

been made in this country of various materials—as iron, zinc, copper, and wood—that it may appear almost unnecessary for me to describe the implement itself; yet as some of my readers may not have seen such a thing, and as they will better understand the mode of operation by knowing its construction, I will give as succinct and clear a description of it as I can. I may liken it to a baby's rocker with the lower part open, and two slips of wood fixed inside to the bottom; one at the lower end, the other in the middle. In lieu of the wood, a square frame with a perforated iron plate, called a hopper, is dropped on the back part, at the top, for the reception of the raw material; a wooden slide is fitted underneath the front part of this frame, and extends to within two inches of the back of the cradle, at an inclination of thirty degrees. When in work the cradle is placed on an inclined plane by the side of the requisite supply of water, be it stream or tank.

We will suppose that the united party of gold-washers consists of four persons. Two will be employed in digging the auriferous soil, one in carting or wheeling it from the pit to the cradle, and the fourth in rocking. The latter fills the hopper with the soil from time to time, then with his left hand rocks the cradle, at the same time that, with his right, he dips water from the reservoir and pours it on the soil. This brings the earth into solution, which passes through the perforated holes of the hopper, and falls on to the slide beneath; from thence it passes to the bottom of the cradle and out at the end. If the cradle is well worked, the first slip of wood at the bottom stops the whole of the gold, or

nearly so. But before the metal is taken out the hopper is frequently refilled, thirty buckets of soil being ordinarily washed for one washing. The person rocking from time to time throws out the stones from the hopper; carefully examining, however, if there are any nuggets amongst them. When the requisite quantity of stuff has been passed through the cradle, a few tins of water are poured through it, the sediment being previously stirred up. The gold mixed with emery, minute particles of quartz, together with crystals and rubies, is now taken out and subjected to the process of pan-washing. In a few minutes it is fit for the market.

A much larger cradle, called by miners a "long-tom," is now very generally in use. But as the principle on which it works is very much the same as that of a cradle, except the rocking, it is unnecessary to describe it. Where very stiff clay, such as is not soluble by ordinary means, has to be operated upon, a machine called a "puddling-box" or "dolly-tub" is used. It is called a puddling-box when acted on by manual labour and shovels; a dolly-tub when it is worked by some other mechanical power. A dolley-tub is a large tub, basin, or reservoir, into which the auriferous clays are thrown. Through the centre passes a spindle, turned by horse or other power, and to the spindle are attached arms for agitating and rudely breaking up the auriferous clay. A stream of water, if obtainable, continually flowing into and overflowing the tub, is the best means for removing the dissolved clay, which passes out in the form of thick muddy water. Where a stream of water cannot be obtained, the muddy water has to be removed from time to time,

leaving at the bottom clean-washed gravel, sand, and gold. When the clay has been thoroughly dissolved the residue is washed by the usual means of cradles or toms.

But by far the best and most efficient method of gold washing that has ever been applied, and I may almost venture to say ever will be applied, to alluvial soil is that of "sluicing;" and it has this advantage over all the complicated modes that I have seen represented as used in Russia and Brazil, that you take the machine and the water to the auriferous earth, instead of taking the earth to the machine.

The "sluice" differs from the long-tom in having no sieve. It is simply a long trough, from 20 to 100 feet in length, and eighteen inches or upwards in width. A stream of water is conducted through it, carrying off the sand, gravel, and clay, while the gold is stopped in its progress by a succession of bars, or cleets, placed across the trough at the bottom. The larger stones are generally removed by a fork, with flat broad prongs, instead of a shovel; sometimes a common shovel is used, but it is apt to throw out some of the gold. Almost any number of men may work at a sluice.

Three or four shovelling in auriferous earth will give employment to one in agitating the clay and gravel, and throwing out the large stones with his fork. A yet more simple mode is bed-rock sluicing. This consists of merely throwing the auriferous soil into a strong stream, which carries off the earth, clay, and small gravel, leaving the gold amongst the rough stones at the bottom. This mode is available when coarse gold is distributed sparingly in a large body of clay. Considerable earnings are made by this means in localities where a prospecting-pan would scarcely



discover the presence of gold. The gold remaining after either of the above methods of sluicing is separated from the stones in the ordinary way, by a cradle or long-tom.

In Hungary a method something between that of the long-tom and sluicing is frequently adopted. There a long plank, or table, with a number of transverse grooves cut in its surface is employed. This is fixed in an inclined position, and the earth which is to be washed is put in the first groove: water is then thrown on it, and the gold mixed with a little sand collects usually towards the lowest groove; the sediment is then removed into a flat wooden basin, and, by a skilful motion of the hand, the gold is separated from the sand.

In Brazil, to quote from Mr. Phillips's valuable little work on gold mining, "the method of proceeding anciently employed, was to open a square pit in the soil until the auriferous stratum was reached. This was then broken up and placed in slightly-inclined wooden vessels, narrower at the bottom than the top. These cases were exposed to the action of a stream of running water, and briskly shaken from side to side until the whole of the earth had been washed away, and the metallic particles alone remained. All these workings were situated either in the dried-up beds of rivers, or on the table-lands, over which a stream of water had at some period flowed. At the present time, instead of opening the ground by manual labour, and afterwards carrying the auriferous earth to the nearest stream for the purpose of being washed, the water is conducted directly to the mining ground; and by thus washing away the mould and exposing,

without the trouble and expense of transport, the auriferous stratum to the action of a stream of water, great economy of labour is evidently effected."

Mr. Phillips, whose work I shall have occasion to quote again, has brought together a variety of different methods of gold-washing adopted in various parts of the world; but he has not noticed one of considerable interest, which I find described in Kelly's Geography. It is a process of a very costly and laborious description, and is stated to have been commonly used in Brazil, wherever, as frequently happened, the position and nature of the ground permitted it. It can, however, only be adopted where the substratum is of granite or rock formation; or where a sufficiently hard bottom may, by artificial means, be formed.

For the purpose of explanation, we suppose the substratum to have been of granite. In that case, if water could be procured at a sufficiently high level (and wherever the metal is alluvial, it might be by artificial means), the ground was cut in steps, each twenty or thirty feet wide, two or three broad, and about one deep. Near the bottom a trench was cut to the depth of two or three feet. On each step stood six or eight negroes, who, as the water flowed gently from above, kept the earth continually in motion with shovels, until the whole was reduced to liquid mud, and washed below. The particles of gold contained in the earth would descend to the trench, where, by reason of their specific gravity, they would quickly precipitate. Workmen were continually employed at the trench, to remove the stones and clear away the surface, an operation which was much assisted by the current of water flowing into it.

After five days' washing, the precipitation in the trench was carried to some convenient stream to undergo a second clearance. For this purpose wooden bowls, called *gamellos*, were provided, in the shape of funnels, about two feet wide at the mouth, and five or six inches deep. Each workman standing in the stream took into his bowl five or six pounds weight of the sediment, which generally consisted of heavy matter—such as oxide of iron, pyrites, and feruginous quartz. They admitted certain quantities of water into the bowls, which they moved about so dexterously, that the gold, separating from the inferior and lighter substances, settled at the bottom and sides of the vessel. They then rinsed their bowls in a larger vessel of clear water, leaving the gold in it, and began again. The washing of each bowlful occupied from five to eight minutes.

A plan very similar to this is described by Mr. Phillips as being still in operation in the vicinity of St. John del Ray, in Brazil. There the principal digging is situated on the eastern side of a hill adjoining the town, and consists of an open area, of which three sides have been excavated in the rock, whilst the fourth, which fronts the west, is left open. "The rock," he says, "here consists either of sandstone or indurated clay, more or less mixed with mica, and is wrought by the aid of numerous streams of water divided into small rivulets, and conducted down its sloping sides. In working the mine the loosened soil is thrown into these channels, and kept in suspension by constant agitation with shovels, until it reaches a pit sunk at the bottom of the excavation, and in which the auriferous, and, consequently, the

heavier particles, are deposited. This well is occasionally emptied, and its contents subjected to a second series of washings, by which the particles of gold are finally obtained in a state of greater or less purity. By this way of mining, large masses of gold are occasionally met with ; but in most instances the chief supply of the precious metal is obtained by the repeated washings of the sands collected in reservoirs situated at the bottom of the excavation." In another, and in the same country, " large quantities of auriferous sands are annually dredged from the bottoms of the rivers by windlasses and iron scoops. The sands thus obtained are received in canoes, to each of which is allotted a gang of four blacks, three of whom superintend the working of the boat and the management of the dredge, whilst the fourth stands on a platform, ready to receive the sand brought up by the iron scoop. These boats seldom collect above three-quarters of an ounce of gold each in the course of one day's work, although the quantity of sand obtained is very large.

In the neighbourhood of Villa Rica, once remarkable for its richness in the metal, various methods of extraction are still adopted, since not only the auriferous sands are subjected to a careful washing, but numerous drifts and levels have been extended into the softer parts of the mountains. Both these excavations and the river washings are entirely conducted by negroes. When at work, these gold-washers are each dressed in a leathern jacket, and furnished with a large wooden bowl, about two feet in diameter, and nearly one foot in depth ; before them is also tied a leathern bag, intended as a receptacle for the

particles of gold they may collect. The localities generally chosen for these washings are those parts of a river in which the water does not flow with too great rapidity, and where it forms deep holes, and makes numerous bends. The large stones and upper layers of earth are first removed, and the bowl is then filled with the deeper and older gravel of the river, which is shaken and washed, and the stones and the sand on the top scraped off, until the grains of gold, together with a little feruginous sand, alone remain at the bottom of the vessel. This residue is now moistened by a little water thrown on by the hand, and washed into the leathern bag before-mentioned. Instead of operating in this way, the final washing of auriferous sands is often conducted in long shallow troughs, the bottoms of which are sometimes covered with skins with the hair on, and placed with the grain against the current of water flowing over the tables. In place of employing skins for this purpose, coarse baize is sometimes used; but in either case the moveable lining is at short intervals moved from the case, and beaten over a tank containing about two feet of water. It is afterwards carefully washed in the same vessel until the last traces of the gold are removed, after which it is again replaced in the trough. In order to obviate the inconvenience of having to remove so frequently the baize cloths or skins from the bottoms of the washing-vessels, an endless web, either of skin or coarse cloth, has of late years been employed with considerable advantage. When this arrangement is used, it is made to move by means of rollers set in motion by the water-wheel used for the purpose of stamping the ore, in a direc-

tion opposite to that of the stream of water flowing on the table. Between the two rollers on the upper side, this web is supported on a wooden table; but, when it has turned over the upper roller, it falls down loosely, and is drawn through a vessel of water, where the gold is washed off, and accumulates. To prevent theft, the tanks in which the gold is deposited are carefully locked up during the night; and, when they have become full, their contents are carefully washed, (often in hand-bowls), until nothing but the gold, mixed with a greater or less amount of feruginous sand, remains."

To these various methods of gold-washing, others, differing in detail, might be added; but all, as is the case with the foregoing, are based on the principle of gravitation. Though I wish the information I may give to be as complete as possible, I think nearly enough has been said on this branch of the subject. Indeed, I should not add to it, but that the reader probably expects to hear something of the mode of operation adopted in the Ural Mountains; especially when it is considered that, until the discovery of gold in California, the chief annual supply of gold came from thence.

There, Mr. Phillips informs us, "the auriferous sands are sometimes thrown into boxes, of which the bottoms are constructed of thin sheet-iron, pierced with numerous small holes; these are placed immediately under a considerable fall of water, and the mineral is kept constantly agitated by workmen, who keep it stirred with shovels. By this treatment, the finer particles are carried through the apertures in the bottoms of the boxes and fall on a series of sloping

tables, on which the workmen constantly brush the ore from the foot to the head of the arrangement with a small heath-broom, and there the particles of gold and other heavy substances accumulate. The sand, after having been thus concentrated and separated from the lighter matter, is further enriched by a second washing on a series of tables of smaller dimensions." The auriferous residue is finally fused with lead ores in a cupola-furnace; a method far less effective than amalgamation, and which I will not take up the time of the reader by describing. Mr. Phillips, likewise, gives an account of a costly and complicated machine, used in the Ural, for separating gold from alluvial soil; but as it would not be possible to make the plan intelligible, without the aid either of a model or a large diagram, I must refer those who take sufficient interest in the matter to that writer's pages for further information.

Thus far I have spoken only of various plans for obtaining gold from alluvial soil by simple washing. As far as our experience has hitherto gone, these methods have proved far more lucrative than any machinery, however well contrived, in which the gold has been separated from the matrix, as it is called, by amalgamation, or other chemical means. To private adventurers, as I have already observed, these more simple modes of operation must ever continue the most advantageous. Shortly after the diggings in Australia were opened, however, many pretenders to science—and perhaps, too, some really scientific men—attempted to introduce their own theories, and offered to teach the rude diggers how gold-washing ought to be conducted. To such an extent did their theories prevail

for a time, that quicksilver rose from 8s. to 32s. per pound. Young men who, probably, had never seen that metal, except in a thermometer, or at the back of a broken looking-glass, laid in a store of this inestimable treasure, at the cost of one-fourth of their little capital. Quicksilver parties were daily advertised, and fortunate did the tyro think himself if he could scrape up money sufficient to gain admittance to a party, thus prepared; which was sure not to lose a particle of gold. The delusion, however, soon vanished; and the men of science were glad to take a lesson from the practical diggers who had learned their art in California.

There are, however, some few localities in which the quicksilver-machine has been used with success; indeed, there are some in which it can scarcely be dispensed with, even by the washer of alluvial soil—that is to say, where the gold is so fine, or in such thin scales, that it is liable to float or be washed away with the soil. The long bar on the Yuba River, in California, is such a locality; and there the quicksilver-machine has been used with advantage. It should be borne in mind that it does not follow, because the gold is very minute, that the diggings must be poor; for the great number of particles may make up for their deficiency in size. Wherever that is the case, the use of quicksilver is indispensable. I will, therefore, describe the mode of working the quicksilver-machine in its simplest form.

The machine commonly used resembles an ordinary cradle, except that the perforated plate, or hopper, extends the whole length, and, like a spout, discharges the gravel and large stones, without its being



necessary for the operator to throw them out as he does in the common washing-cradle. The bottom of the machine, too, instead of having small bars, or cleets, is divided into ten or twelve compartments, from four to six inches in width, and from three to four in height. Each of these compartments is made to slide in and out of the machine, the more conveniently to obtain the contents when required. Each compartment is charged with quicksilver, and consequently the machine must be very tight and carefully constructed. The machine is worked like a common cradle; and usually by four men, exclusive of those employed in digging. The gold, together with the lighter particles of soil, passes through the hopper to the body below; and while the soil passes away in the shape of diluted mud, the gold amalgamates with the quicksilver beneath, and is there fixed till separated from it by heat. When the drawers or lower compartments are taken out, the contents are separated from the sand by washing in a wooden, or copper dish, and nothing is left but an amalgam of gold and quicksilver.

This amalgam is at first in a liquid state, and therefore is strained by the hand through a chamois-skin, which separates the liquid mercury, and leaves the residue in a solid state. This solid amalgam is afterwards distilled in a retort, or cast-iron vessel, like a spirit-still without the spiral worm. The retort is from four to six inches in diameter, and is divided into hemispheres, which are screwed together after the introduction of the amalgam. The retort is then placed on a fire, with the end of the tube in cold water, which receives and condenses the evaporated

quicksilver, the unmixed gold being left in the retort, whence it is removed as soon as the vessel is sufficiently cool to be opened. A very common, but a very extravagant, mode of obtaining the gold from the amalgam used in California was, after straining it through the chamois-skin, to heat it in a clean frying-pan over a fire, and so allow the quicksilver to evaporate.

This simple explanation of the method of separating the particles of gold from the alluvial soil in which it is deposited by chemical means, will be sufficient to inform the unlearned of the manner in which it operates, even in the most complicated machinery. The quicksilver has the property of seizing and retaining the minutest particles of gold, and can only be separated from them by evaporation.

Were I attempting to treat my subject scientifically, and in detail, I should now proceed to describe the various, or rather some of the multitudinous machines, that have been from time to time invented for the purpose of separating the gold from the rock, in which it is so often found imbedded or infused. But this would involve many technicalities, which would be uninteresting to the general reader. Still, it is possible to explain intelligibly the principles on which all such machines profess to act; and it is possible, too, to form and give an opinion as to which machine acts most effectually. But, before we inquire into the principles on which these machines work, it will be well, I think, to consider on what material they will have to act.

It is an undoubted fact, that almost the whole of the gold obtained for the use of man up to the present

time, has been obtained from alluvial soil, and not from rock. An apparent exception, indeed, to this statement, may be argued from the passage from Pliny, which I quoted at the beginning of the present chapter, where he speaks of mountains being turned upside down in the search for gold. But, as we know little or nothing of any chemical means used by the ancients for separating or extracting the minute particles of gold from the solid rock, no argument can be drawn from that instance of their belief in a theory now becoming very prevalent among professed geologists. The theory I allude to is, that quartz is the matrix of gold. The practical result of that theory is, that wherever quartz with certain concomitants is found, there a costly gold machine is likely to be erected, a company formed, shares bought and sold, fortunes lost and fortunes made; but, too often, not by gold extracted by an operation as desperate as the Cæsarian, from the supposed prolific matrix.

That gold is frequently to be found intermixed with quartz—and in considerable quantities, too—I by no means deny. But I believe, as it has proved hitherto, so it will continue to be found, that gold is much more abundant in alluvial soil than in rock formations; and, as alluvial soil containing gold is abundant, and, moreover, is capable of being worked at far less expense than rock, it follows that it would be far more advantageous to operate on alluvium than on rock. Nay, I am persuaded that for years—I might almost say centuries—to come, the rude digger will beat the quartz-crushing companies out of the field; will, in a word, continue to be, as hitherto, the chief means of supplying the market with native gold.

Having all along confessed my ignorance of geology as a science, it may, perhaps, be thought presumptuous in me to attempt to arraign the opinions of men who are acknowledged—or boast to be—proficients in that science. But I believe that many professed students of that science, as of others, are apt to adopt too readily the opinions of professed masters, without themselves investigating the proofs on which any particular conclusion has been arrived at. I therefore do not regard the opinion of all geologists on the theory which I am about to question as the result of investigation in each separate case, but rather as the almost blind adhesion of the mass of geologists to the authority of one or more who first broached the theory itself. I have no scientific reputation to stake on the truth or error of my own theory; perhaps it may be thought that I have not sufficient pretensions to put forward a theory at all. But it is scarcely possible for a man to be arduously engaged in any one pursuit for a long period of time without directing his thoughts beyond the mere mechanical part of his labours; and, if his mind is not prejudiced in favour of any particular system, he naturally builds up theories of his own. My own conclusions, indeed, may be very erroneous; and I shall explain them very briefly when I have stated my objections to what may be called the popular theory, or received opinion, of the day. My object is rather to expose the fallacy of that than demand acceptance of my own: the latter must stand or fall, according as scientific researches shall, in their progress, uphold or destroy it.

The theory, then, to which I object is this, *that quartz is the matrix of gold*; by which I understand

that all gold must have been produced by means of quartz as its matrix or mould. If this be true, one might as well expect a pig to lay an egg, as sand or alluvial soil to produce gold. I by no means say that they do. But in, and mixed with them, gold is found; and that in larger quantities than in the supposed matrix. Then, it is argued, that the gold has been separated from the supposed matrix by abrasion—by the washing of torrents or streams—perhaps, by decomposition. But, admitting the separation by all or any of these means, how is the present position of the gold in sands on the sea shore—as on the Guinea coast in Africa—or in alluvial deposits, far distant from quartz rocks, to be accounted for? The theorists must show a power equal to so vast an effect. It may be proper here to consider how great that effect has been in certain ascertained cases, in order that we may the better see how inadequate any known power must have been to produce it.

To set this before the reader in the clearest light, I will quote a passage from Dr. Ure's "Dictionary of Arts, Manufactures, and Mines," which appears to me to be conclusive. He says:—"It has been supposed that the gold found in the beds of rivers had been torn out by the waters from the veins and primitive rocks, which they transverse. Some have even searched, but in vain, at the source of auriferous streams for the native bed of this precious metal. The gold in them belongs, however, to the grounds washed by the waters as they glide along. This opinion, suggested at first by Delius, and supported by Deboin, Guettard, Robitant, Balbo, and others, is founded on just observation. 1st. The soil of these

plains contains frequently, at a certain depth, and in several spots, spangles of gold separable by washing. 2nd. The beds of auriferous rivers and streamlets contain more gold, after storms of rain, upon the plains, than in any other circumstances. 3rd. It happens, almost always, that gold is found among the sands of rivers only in a very circumscribed space ; on ascending these rivers their sands cease to afford gold ; though did this metal come from the rocks alone, it should be found more abundantly near the source of the rivers. Thus it is known that the Orco contains no gold, except from Pont to its junction with the Po. The Techeeno affords gold only below the Lago Maggiore, and, consequently, far from the primitive mountains, after crossing a lake, where its course is slackened, and into which whatsoever is carried down from the mountains must have been deposited. The Rhine gives more gold near Strasburg than near Bâsle, though the latter be much closer to the mountains. The sands of the Danube do not contain a grain of gold, while this river runs in a mountainous region ; that is, from the frontiers of the Bishopric of Passau to Efferding ; but its sands become more auriferous in the plains below. The same thing is true of the Ems ; the sands of the upper portion of this river, as it flows among the mountains of Styria, include no gold ; but, from its entrance into the plain of Steyer, till its embouchure in the Danube, its sands become auriferous, and are even rich enough to be washed with profit."

These arguments, or rather these facts, appear to me unanswerable ; and they are so simple that any one who has never read a syllable on the subject of

geology may comprehend them, and see their force. Another argument, not perhaps so easily understood by every one, is to be derived from the science of geology itself. It is this. If quartz is the matrix of gold, by the unvarying laws of nature, according to which one matrix can only give birth to one species of production, it ought to produce gold, and gold only. But iron, lead, copper, and tin, are continually found associated with it. Is it their matrix too? Shall the same beast produce an ox, an ass, a dog, and a cat? Again, though I believe that one and all of those metals are invariably found associated with quartz that contains gold, yet they are constantly met with in quartz and granite that contain no gold at all. Whereas, if quartz is the matrix of gold, if it produces anything, it ought to produce gold.

Thus far my arguments have only been negative. But, as such, they should be of some use, if they are sound; for they tend directly to check a wild species of speculation that seems likely to grow rife amongst us, namely, that of seeking for gold in the most improbable localities, and—which is the evil I would warn all my readers against—that of forming companies to work for gold by expensive machinery, incurring great disappointment and loss to many who are not in a position to judge for themselves; and who, if they are carried away by this theory, that quartz is the matrix of gold, will be led blindfold to their own ruin. The alluvial gold mines in Australia (if I may so call them), have now been worked for more than three years—with what success is well known. For nearly three years, more than one quartz-crushing company have been in being, having altogether

upwards of a million of money locked up during much of that time. Yet I will venture to say that not one of them has paid 1s. per £100 annual dividend on the paid-up capital, from gold produced from quartz. And when it is considered that there are thousands of miles of rocks of quartz formation in Australia, the reader may form some notion of the extent to which John Bull may be duped, if that honoured personage should give credence to this notable theory, and to the certificates of rich localities which may pour in from the Antipodes to lure him to join in the venture.

I by no means deny that gold, and in considerable quantities too, is to be found embedded in quartz rocks; for it is found there in masses of considerable size, and in minute specks invisible to the naked eye, as many trials in this country have proved. But I do not, for a moment, believe that it is so evenly spread in quartz as in alluvial soil; and, consequently, it does not follow, because gold may be found in one ton of quartz, that, therefore, the whole mass of surrounding rock is equally impregnated with it—or, as I should rather say, has it infused throughout it; whereas, it almost always happens that where a rich spot of alluvium is met with a considerable surrounding space is equally rich, or nearly so.

But to come to my own theory: I believe gold and quartz to be of twin birth, and that they were ejected simultaneously from the bowels of the earth, the gold in a fluid state, and the quartz in the form of a liquid resembling a jet of steam; and that when this steam, or liquid, in its passage upward, reached a temperature sufficiently cold to condense it, the liquid



substance became solid, and retained the particles of gold that at the instant were in contact with it. For, as I have already attempted to show, the quartz cannot generate, nor produce, the gold, and it is obvious that no force could have driven the minute particles into the quartz in a solid state; so that the only reasonable supposition appears to me to be, that it must have found its way into the quartz when both were in a fluid, or liquid state. The same force that produced this effect, would likewise, and at the same time, suffice to throw the gold over those alluvial localities in which it is now so abundantly found; but being mixed with a matter far more perishable than quartz, that matter, acted upon by atmospheric influences, and by streams or floods, has long ago decomposed, and, together with other decayed substances, has formed the alluvial soil in which it now lies. This theory, I may observe, is strengthened by the unvarying fact (unvarying as far as my experience goes), that wherever gold is found imbedded in quartz rock, or wherever a lump of gold is found mixed with quartz, but separated from the main rock and imbedded in the alluvium, there are in the rock evident marks of its igneous origin. And this I believe squares with the received theory of geologists themselves, who, if I mistake not, trace the formation of the earth's surface generally to volcanic action. So that I am only extending their comprehensive theory to a particular case which they would exclude from it.

I have now detained the reader so long on this topic, that I will only say a few words in conclusion on the subject of quartz-crushing machines; and I need say the less, because a visit to one factory of

such machines, or an inspection of a detailed plan of one, would give a far better insight into the mode of operation than any verbal explanation of the most skilled engineer could do. But the principle of them all is, and must be, the same, and can be made intelligible in a few words. The object of the quartz-crusher is to separate the gold completely from the rock; and, as the metal is very often infused in it in particles so minute as to be invisible, not only to the naked eye, but through a glass with a very powerful lens, it is obvious that that machine will answer best which reduces the quartz to the finest powder. It is said, I believe, that 3 dwts. of gold, extracted from a ton of quartz, will yield a profit after paying the cost of separation. Now, I need hardly observe, that 3 dwts. consist of 72 grains, whilst a ton weight contains 15,680,000 grains, which, divided by the 72, gives 217,770 grains of quartz to one grain of gold. But I am speaking within the mark when I say, that it requires 50 specks of this invisible gold to make up one grain in weight; so that, at that low calculation, each ton of quartz must be broken, or pounded, into 78,400,000 particles, and from them 3,600 particles of metal extracted to make up the 3 dwts. Now, to effect this result, three different methods have been adopted—namely, stamping, grinding, and crushing.

The process of stamping is effected by a machine, called a stamping-mill, which is so formed that large masses of cast-iron are made to fall, in rapid and successive strokes, on the ore that is to be broken. The mineral itself is enclosed in a large wooden trough, in which are openings fitted with fine gratings, made

by punching small holes in thin sheets of soft iron. A stream of water is kept continually passing through the trough, so as to carry off, through the grating, the particles that are reduced sufficiently for the purpose. The ore so pulverised is carried by the stream of water over an inclined table, which is so constructed as to retain the heavier particles, while the lighter are washed away. The metal is afterwards separated from the residue of the rock by means of amalgamation.

Of the process of grinding in a mill I should not speak at all, were it not that Mr. Phillips mentions it as a process more effectual than crushing. He does not, however, speak of any locality in which it is had recourse to; nor am I aware that it is anywhere used. It is, indeed, employed in the silver-mines of Mexico, for the purpose of reducing to a still finer powder the ores that have first undergone the process of stamping.

Quartz-crushing, which, owing to the defects in the machinery, was formerly not so effectual as stamping, now promises to become the most effective process of any; and the machine lately invented by Mr. Berden seems likely to throw all others for the purpose into the shade. This machine has already been introduced into the mines of California, and is being extensively used in this country; and it will probably soon be in operation in Australia, if it is not so already.

The features of the machine are, both mechanically and chemically, novel. The official explanation is as follows:—It consists of a cast-iron basin, seven feet in diameter, revolving on an inclined axis. In this

basin are two cast-iron balls, 34 and 24 inches in diameter and weighing respectively 5,000 and 2,000 lbs. Beneath the basin and attached thereto, and revolving with it, is a conical furnace. The whole is hung in strong framework of timber, and receives motion by steam or other power. The operation is conducted in the following simple manner:—A fire is made in the furnace beneath the basin; about 30lbs. weight of quicksilver is placed in the basin, and the ore thrown in in lumps of tolerable size. Water is then allowed to pour from a jet over the balls. The apparatus is set in motion; the balls, by their gravity, revolving in a direction opposite to that of the basin, and being in contact with each other, and with the inclined bottom of the basin, acquire a spiral as well as a rotary motion, a combination most desirable in pulverisation. The instant the ore is brought under the balls it is crushed to an impalpable powder. The crushing is effected at the point of contact between the large ball and basin, and below the surface of the mercury. Thus, the moment the minutest particle of gold is separated from the ore, it is seized by the heated mercury and secured. The refuse powder rises to the surface of the water, and is carried off, in the form of a thin paste, through openings in the side of the basin. This refuse is technically called "tailings." After the lapse of the necessary time, the quicksilver is drawn from the basin, and strained through buckskin; the gold remains behind in a state of amalgamation, with a certain portion of quicksilver, and in this state it is technically called "amalgam." The amalgam is then put into a crucible with a little borax, and the quick-

silver is evaporated by heat, leaving the pure gold at the bottom of the crucible. The mechanical novelty consists in the arrangement of an inclined revolving basin in connection with balls of the size and weight to produce a rolling and grinding motion hitherto unattained. The chemical novelty consists in the heating of the mercury, which greatly increases its affinity for the gold; and the minds of several scientific gentlemen are now occupied in an endeavour to elicit the amount of electrical or galvanic agency evolved during the operation.

In my next and concluding chapter I purpose to trace the history of what is called the Land Question in Australia; and, in reference to the regulations which are in force with respect to the liberty of searching for gold, shall show how the gold-finder and capitalist, and the emigrant generally, are affected by the present system.

## CHAPTER VI.

## THE LAND QUESTION IN AUSTRALIA.

Rise and progress of the colony—All its wealth lies in the produce of the soil, agricultural, pastoral, or mineral—Importance of the Land Question—Encouragement and assistance afforded to cultivators of the soil in the early history of the colony—James Ruse, the first independent farmer—Futile attempts to regulate wages, 1795—Ruin caused by the overflowing of the Hawkesbury, 1806—Researches prosecuted in the interior under General Macquarie, and with what success—Drought in 1818—Led to the discovery of Bathurst Plains—History of Government regulations as to terms of grants of land—Extensive concession to the Australian Agriculture Company; has the effect of increasing the demand for labour—Colonisation of Port Philip and South Australia in 1835—Attempt to concentrate and restrict the population of Port Philip—Proves futile—Gradual rise in the value of land—Unjust pretensions of the "Squatter" class—Provisions of 9 and 10 Victoria, Cap. 104, and the Orders in Council in pursuance thereof—Extent of the settled and unsettled lands, and the regulations affecting each—Necessity for some regulation by the Home Government on the subject—The Duke of Newcastle's letter of the 13th Nov. 1853.

In my first chapter I stated that it was not my intention to make gold alone my subject; but that I should likewise take under review the gradual rise of the colony of New South Wales, from its degraded and insignificant condition as a distant penal settlement, to its present state of freedom and affluence.

The whole wealth of Australia, at present, un-

doubtedly consists in the produce of its soil, coming either directly, as from its mines—whether of coal, copper, iron, lead, tin, or gold—or indirectly, as from its agricultural and pastoral resources. Of its gold-mines enough has already been said, except so far as the regulations imposed on those who are employed in the search for gold is concerned; and of them I shall take occasion to speak in the course of the present chapter. On the coal, copper, iron, lead, and tin mines, it is foreign to my present purpose to treat.

I feel that I should fail in completing the object which I proposed to myself in undertaking the present work, and also fall short of the expectations of my readers if I were to neglect dwelling at some length on what is called the Land Question—a question on the just and wise settlement of which the future prosperity of that vast country, and the social and political character of its population, mainly depend. I propose, therefore, to trace from its very first beginning the history of that important question; to show its present position; and then to state the objections which, in common with a very large majority of the people of Australia, I entertain to the existing regulations, as tending to fetter and embarrass the industry and resources of the community.

I need hardly remind the reader that at the landing of the first colonists, if such they may be called, on the shores of Port Jackson, in the beginning of the year 1788, the whole country accessible to its new inhabitants was covered with a dense forest, made almost impassable by a close and thickly-matted underwood. And even now, when the emigrant

for the first time enters that magnificent harbour, he cannot fail to be struck with the vast extent of primeval forest that still remains uncleared. A considerable part, indeed, of its southern shore, and of the bays with which it is indented, has been cleared ; and the landscape is enlivened by the introduction of picturesque villas, and some buildings which really deserve the name of mansions ; but the greater part of its northern shores and bays is still left in its primitive savage wildness.

This vast forest, then, at the time of the formation of the colony, had first to be cleared to the extent necessary to afford space for buildings capable of accommodating a population of some thousand people, as well as public offices and stores ; and, shortly after that, before any available quantity of land could be brought into cultivation, a more extensive clearing was requisite. The first spot fixed upon for agricultural purposes was a small cove situated a little to the south of the first landing-place, the original site of the town of Sydney. This was the first farm, comprising only a few acres ; probably, at a guess, not more than twenty. It was called, as it was in fact, "Government Farm," and the cove to the brink of which it extends, is still called Farm Cove, though the site of the farm itself has been converted into public botanical gardens.

The greater part of the substratum of Sydney itself, and of the surrounding country, consists of barren rock and sand almost as barren. Yet, strange to say, the recesses of almost all the numerous bays which encircle the harbour are patches of alluvial soil of the richest description, varying in extent from



probably two to twenty acres. Of these rich plots, some are still uncultivated, and covered with bush ; while others are let as market-gardens, at a rental of many pounds per acre. It is probable that the great density of the bush in some of these luxuriant and fertile spots, prevented the first colonists from discovering all the numerous localities available for agricultural and garden purposes which were within their reach ; but it is not so easy to understand why the fortunate owners of these spots have allowed so many of them to remain unoccupied and unproductive ever since.

But to proceed with our history. At the very outset attempts were made to cultivate the soil under the direction of Government overseers ; but, either from ignorance or bad management, the results were altogether incommensurate with the cost and labour bestowed. Extraordinary inducements, too, were held out to free settlers to devote their attention to agriculture ; huts and farm buildings were erected at the Government expense, agricultural implements were furnished, as well as grain to sow the ground, and such live stock as could be spared from the Government herds and flocks—if they deserved the name ; in addition to all which, a number of convicts with full rations were assigned to the adventurer to assist in clearing and cultivating the land ; and the adventurer himself was fed from the Government stores for the space of eighteen months.

It was not until April, 1791, three years and a quarter after the first settlement of the colony, that a settler named James Ruse (his name deserves to be recorded), declared that he was able to support himself without Government aid, on a farm which he had

occupied fifteen months. He received as a reward a grant of 140 acres of land in fee simple. At the close of the year 1792, as I mentioned in the first chapter, there were sixty-seven settlers, holding grants of 3,470 acres of land, of which 417 were under cultivation, and 100 more cleared. But the inadequacy of the produce to the wants of the population, even when added to the public stores, which alone ought always to have been sufficient for the purpose, may be inferred from the following list of prices at this period:—in December, 1792, we find that sheep were ten guineas each, breeding sows about the same price, milch goats eight guineas, laying hens ten shillings; flour was 9d. per lb., and potatoes were 3d.

Shortly after the arrival of Governor Hunter in 1795, the rich alluvial land on the banks of the Hawkesbury was thrown open to the settler, and not long afterwards the discovery of the lost cattle (mentioned in a previous chapter) both furnished a valuable addition to the live stock of the colony, and opened out a large tract available for agriculture. With such prices for farm produce, as have just been mentioned, free labour would of necessity be high; and as so many had to be fed, who in such a state of society (that of a mixed military and convict settlement) do little or no work, the more abundant the crops the more difficulties would there be in getting them in. An attempt was now made, under the sanction and advice of the governor, to fix the rate of harvest wages at ten shillings a-day; but, as must always be the case, the laws of supply and demand prevailed, and employers as well as employed found

it their interest to connive at an evasion of the penalties idly imposed on those who stood out for wages beyond the regulation amount. Still the progress of the colony was sure though slow, and subject to occasional reverses. In 1798 the land sown with wheat and maize amounted to upwards of 6,000 acres—a much larger proportion, with reference to the number of the population, than is now cultivated in a similar way in any of the Australian colonies.

After but a few years of this cheering progress, a calamity occurred which plunged the colonists into a state of utter despair, from which they but slowly recovered. In the winter of 1806 the river Hawkesbury overflowed its bounds to such an extent, that houses, cattle, and crops, were in one night all swept before it. Famine and famine prices were the immediate consequence. Wheat rose to four pounds the bushel, and the two-pound loaf was sold for five shillings; other necessities of life, of course, realising prices in proportion.

In 1809, however, the dawn of better days appeared. Governor Macquarie then arrived. In his first despatch he thus describes the state in which he found the colony:—"I found the colony," he says, "barely emerging from infantine imbecility, suffering from various privations and disabilities; the country impenetrable beyond forty miles from Sydney; agriculture in a yet languishing state; commerce in its early dawn; revenue unknown; threatened with famine; distracted by faction; the public buildings in a state of dilapidation; the few roads and bridges almost impassable; the population in general depressed by poverty; no credit, public or private; the morals

of the great mass of the population in the lowest state of debasement; and religious worship almost totally neglected."

With most of the drawbacks to prosperity above described I am not now concerned; I have only to trace the gradual advancement of agriculture, and the development of the resources of the country. In the first year of his government, Governor Macquarie made a tour through the settled districts of the colony; which, however, in no direction extended many miles. He fixed on several new localities on the river Hawksbury as the sites of townships, and offered grants of land in the neighbourhood to persons willing to erect dwellings according to prescribed plans, and to conform to certain regulations, which he deemed requisite to ensure the due cultivation of the soil; these and others he also supplied with cattle, sheep and goats from the Government stores, to be paid for in grain after a credit of eighteen months. The result of this liberal policy was, that in the course of a few years all the best land on the banks of the Hawksbury was in cultivation; and in the year 1812 upwards of one-fifth of the whole population of the colony was settled in that district.

At the present day (if I may be pardoned the digression) the opinion prevails that the interior of Australia consists of a vast arid desert—an opinion probably no better founded than a similar one that was so fully received, at the period first spoken of, as to find a place in a report of a committee of the House of Commons. It is there stated that some persons "have with difficulty been as far as 100 miles from the coast; but beyond sixty miles it

appears to be nowhere practicable for agricultural purposes; beyond Port Stephen and Port Jervis these settlements will not be capable of extension; and of the land within the boundaries one-half is absolutely barren." The very next year showed the absurdity of this account, and the folly of a few gentlemen, acquainted only with the formed roads of Europe, pronouncing a land upwards of 2,000 miles in diameter unavailable beyond sixty miles from the coast.

What voluntary efforts failed to accomplish, the imperative law of Nature effected. In 1813 a severe drought destroyed most of the crops, and deprived the sheep and cattle of pasturage. In these straits, three gentlemen, whose names I have mentioned in a former chapter, effected a passage across the Blue Mountains, and came upon the magnificent pasturage of Bathurst Plains—plains which contain about 120 square miles of naturally clear land, and are watered through their whole length by the Macquarie River. Upon hearing of the result of this expedition, the Government lost no time in having a practicable road formed across the mountains; but many of the settlers could not wait for the tardy progress of constructing roads over mountains, and bridges over the various streams that intercept the passage, and at once drove their flocks and herds to this newly-discovered region. The progress made during Governor Macquarie's rule in developing the resources of the country may be inferred from the fact that, whilst in 1812, the whole land occupied for both agricultural and pastoral purposes amounted only to 95,000 acres, at the close of his administration in 1821 the

number of acres granted to private individuals amounted to no less than 400,000.

During the whole of this period, and for long afterwards—indeed until it began to be discovered that the land possessed some intrinsic value—those who received grants were aided by Government servants in cutting down and burning the timber, and in preparing the land for cultivation, it being the chief object of the Government to lessen its own burdens by getting as many mouths as possible fed free of cost to the public; and this, it must be observed, was one step in advance of the original plan, when the owner and his labourers were for eighteen months maintained out of the public stores.

The extent of the grants made was, in most instances, in proportion to the means of the applicant. But it soon appeared that some situations were more valuable than others; indeed, had acquired a money value, which, under Macquarie's successor, Sir Thomas Brisbane, was turned to some account. In somewhat less than one year and a-half the latter sold 369,000 acres at 5s. an acre, reserving in addition a quit-rent of 2s. per 100 acres. He also, between the years 1823 and 1825, granted 573,000 acres at an annual quit-rent of 15s. per 100 acres, having in previous years granted 180,000 acres at the lower quit-rent of 2s. per 100 acres.

The increasing prosperity of the colony—coupled, no doubt, with the difficulty of finding advantageous employment for capital at home—led to two very important events in the history of New South Wales. One was, the introduction of a fixed system for the

disposal of land; the other, the grant of a million of acres to the Australian Agricultural Company.

Upon the former head, the Government regulations were in substance as follows:—The whole territory was to be divided into counties, hundreds, and parishes; each parish to contain twenty-five square miles. All the lands were then to be valued, and an average price struck for each parish; and all the lands of the colony not granted to individuals, or appropriated for public purposes, were to be put up at the average price thus fixed. The largest quantity of land which any individual was to be allowed to purchase was 89,600, but it was to be generally put up in lots of three square miles, or 1,920 acres. Any purchaser who, within ten years from the date of his purchase, should, by the employment and maintenance of convicts, have relieved the public from a charge equal to ten times the purchase-money, was to have the money returned, but without interest. Each convict employed for twelve months was to be computed at £16 saved to the public. Persons wishing to become grantees without purchase, might obtain land on satisfying the governor that they had the power and intention of expending, in the cultivation of the land, an amount of capital equal to half its estimated value. Grants might also be made of not less than 320 acres, and not more than 2,560, subject to a quit-rent of five per cent. per annum on the estimated value, redeemable within the first twenty-five years at twenty years' purchase, with a credit for one-fifth of the sums the grantee might have saved the Crown by employing convicts. No quit-rent was required for the first seven years;

but the grantee was subject to forfeiture of his grant if unable to prove, to the satisfaction of the surveyor-general, that he had expended a capital equal to one-half its value.

This scheme was obviously liable to one very great objection—that the extent to which the grants were limited was too large. No opening was left for that most useful class of settlers in a new country—small farmers, who, with a trifling amount of capital and their own labour, would have soon grown corn sufficient for the wants of the population. But this and other evils, with which the system was encumbered, were much aggravated by a body of impracticable regulations that were shortly afterwards appended to it by the Land Board of officials on the spot. Mr. Sidney thus sums them up :—“ Persons desirous of obtaining land were (1) to apply to the Colonial Secretary for a form to be filled up and submitted to the governor, who (2), if satisfied of the character and respectability of the applicant, directed the Colonial Secretary to supply him with a letter (3) to the Land Board, in order that they might carefully investigate the stock, articles of husbandry, and cash, forming part of his capital. On the Land Board reporting (4) to the governor satisfactorily as to capital, the governor furnished the applicant (5) with a letter to the surveyor-general, who (6) was to give him authority to proceed in search of land. When he had made his selection, he had to apprise the surveyor-general (7), who, twice a month, was to report (8) to the governor, and if approved (9) by the governor, the applicant received written authority (10) to take possession of the land until his



majesty's pleasure should be known, or the grant made out. Grants to be in square miles—one square mile, 640 acres, for each £500 of capital to the extent of four square miles." These regulations were made in 1826, and in the following year received the sanction of the Colonial-office at home. In the meanwhile the Australian Agricultural Company received a free grant of a million of acres, with a monopoly of the working for and sale of coal. I cannot give you a better description of their plans and operations than by again quoting from Mr. Sidney's valuable work on the colonies of Australia. He says: "They rested their hopes of profit, 1st, on the growth of fine merino wool; 2ndly, on the breeding of cattle and other live stock, and the raising of corn and tobacco, for the supply of persons resident in the colony; 3rdly, on a production, at a more distant time, of wine, olive oil, hemp, flax, silk, and opium, as articles of export to Great Britain; 4thly, on a progressive advance in the value of land, as it becomes improved, and by an increased population. The grant of land was made on the ground that the colony would derive advantage from the importation of so large a capital invested in cattle, horses, and sheep of the Cheviot breeds; in the cultivation of the produce of Southern Europe, and that the mother country would be saved the cost of maintaining a certain number of convicts."

At that period it was still so much an object with the Government to relieve itself of the cost of the maintenance of criminals, that it was agreed that the company should be relieved of quit-rent, on condition of their employing a certain number of convicts. A

natural consequence of this arrangement (which very soon followed) was, that the value of convict-labour rose so rapidly, that they were never able to obtain the stipulated number of servants; and, in 1830, the Editor of the "Sydney Monitor" proposed, that convicts should be sold to the highest bidder, anticipating that they would realise, in lots of 200, £100 a-year each for five or ten years!

In short, the proceedings of the company produced, in the then state of the colony, a financial revolution. They sent out from England a numerous staff; cargoes of implements and breeding-stock, on a most costly scale; purchased ewes and heifers so largely, that the price was raised one, and even two hundred per cent. throughout the colony. The company, with a long pocket, was a universal purchaser, and sellers were never wanting as long as they had any money to invest. A reaction, of course, followed, as it always does follow, extravagant expectations of pecuniary profit. The colony, nevertheless, derived advantage from the introduction of the company's capital and superior stock of sheep, horses, and cattle. The grand ideas of vineyards, olive-oil, opium, silk-worm cultivation, and orange-groves, were never extended beyond the resident manager's or commissioner's garden. Unfortunately, any beneficial influences produced by the operations of the company were neutralised by the regulations on the subject of coal, which, whilst they handed over a large tract of coal-seams to the superior machinery and active capital of the company, actually prohibited the colonists from working, on any terms, coal which might be found under their own estates.

In 1831 another change took place, an order being sent out from the Home Government that grants of land should be altogether discontinued, and sale by auction substituted, at a minimum upset price of 5s. an acre. At the same period, or shortly afterwards, the privilege of having assigned servants was taken away.

In 1835, Governor Bourke conveyed, through the Legislative Council, an Act to restrain the unauthorised occupation of Crown lands, on which the squatting system is founded; and in the following year he commenced issuing the licenses under which two-thirds of the stock of New South Wales and Victoria are now pastured.

In the year 1835 an event occurred which had a great and permanent influence on the fortunes of the colony. The whole accessible pasturage of Van Dieman's Land had been appropriated, so that the stockowners had no runs for their sheep and cattle. A party of ten crossed over to Port Philip, which was then a wilderness, and took unauthorised possession of some of the finest plains in existence. With such rapidity and in such numbers did these unauthorised squatters pour into the country, that the Government was forced to tolerate their intrusion and give them licenses of occupation. Thus a new territory, of vast extent, and one (I think I may, without fear of contradiction, say) unsurpassed in richness, was made available for agricultural and pastoral purposes. Its enormous resources may best be evidenced by the single fact that a territory which, in 1835, was utterly unpeopled by Europeans, in sixteen years had reached such a growth as to be converted into a separate and independent colony, and that it

promises ere long to be the chief seat of government of all the Australian colonies.

In the same year likewise—that is, in 1835—a charter was granted for colonising South Australia, still further distant from New South Wales. Of the system there adopted it may almost be sufficient to remark, that its principal object seems to have been to prevent the labourer rising above his station, and becoming himself a farmer; such a price being put on the land as would, in most cases, place it out of his reach to purchase. A more fallacious scheme can scarcely be imagined; for, in a country possessing a boundless extent of unappropriated fertile land, to attempt to fix and maintain a price beyond its marketable value is a mere delusion; and so it has proved.

Under the influence of the same theory, an attempt was made to concentrate and confine within narrow limits the population recently settled at Port Philip. But Governor Bourke, in a letter, part of which I quote, shows the futility of such an attempt. “Admitting,” he writes, “as every reasonable person must, that a certain degree of concentration is necessary for the advancement of wealth and civilisation, and that it enables Government to become at once more efficient and more economical, I cannot avoid perceiving the peculiarities which, in this country, render it impolitic, and I may say impossible, to restrain dispersion within limits that would be expedient elsewhere. The wool of New South Wales forms at present its chief wealth. The proprietors of thousands of acres find it necessary—equally with the poorer settlers—to send large flocks beyond the

boundaries of location, to preserve them in health throughout the year. The colonists must otherwise restrain the increase, or endeavour to raise artificial food for their stock. Whilst Nature presents all around an unlimited supply of wholesome pasture, either course would seem a perverse rejection of the bounty of Providence. Independently of these powerful reasons for allowing dispersion, it is not to be disguised that Government is unable to prevent it." Notwithstanding this conclusive reasoning of Sir Richard Bourke, the Home Government persisted in its attempt to enforce concentration, by putting a high price on land. In 1838, before Governor Bourke's letter had reached England, his successor, Sir George Gipps, was instructed to raise the upset price from 5s. to 12s., with directions to check the sale of land even at that price, if he should observe that the extension of the population still proceeded with a rapidity beyond what was considered desirable, and that the want of labour still continued to be seriously felt. Not only were these instructions acted upon by the Colonial Government, but in 1842 an Act was passed by the Imperial Legislature, fixing the minimum price of land at £1 per acre—an Act which still remains in force, and which, as long as it is in force, must work the very evil it is intended to prevent, by compelling the cultivators of the soil to seek more distant and fertile localities, instead of the nearer but less fertile ones.

But—strange inconsistency!—all the while this impolitic system, as regards the absolute sale of land, has been, and is persisted in, indulgencies have been granted to the squatters, as they are called—that is,

the owners of vast herds of cattle, droves of horses, and flocks of sheep ; which have not only tended to produce an extensive dispersion of the population, which the high price of land was intended to prevent, but have raised up a kind of estate in the country which threatens to override both Government and people.

This estate or class is known by the name of the "Squatocracy." In their hands rests almost the entire representation of the colony in the Legislative Council. Their chief or leader, now in this country, was the author of the Act of Council to introduce a *Botany-Bay nobility* ; and if the constitution which they now propose shall become the law of the land, to this class must be left the settlement of the land question—a question in which they are themselves so deeply interested ; and in the right settlement of which, more than in any other, is involved the future prosperity and character, not only of the mass of the people of Australia, but of all who at any future time may migrate from the mother country to any of our colonies in the southern hemisphere.

To illustrate the present state of this question, and give a fair notion of its magnitude and importance, I will relate an incident which has occurred within my own knowledge, and which might be paralleled by hundreds of a similar character—in fact, it is but a solitary instance of a prevailing system.

Many years since, a non-commissioned officer, in a regiment of the line, planted himself as a humble settler at some distance from Sydney, and took up his residence in one of the miserable slab huts that generally constitute the home of the pioneer of civil-

sation. Industry and thrift produced their proper fruits—wealth, comfort, and independence. I do not mean to trace the history of this very worthy settler's rise—he undoubtedly deserved the prosperity which attended him. The only matter I mean to remark upon is the unjust position—unjust as regards the colony at large—in which the law, as at present understood in Australia, has placed him or his descendants. The son of this industrious settler, within one month before I left Sydney, advertised his sheep and cattle stations for sale—whether all or not I cannot say. They were classed in four separate establishments. The first is represented as having thirty miles frontage to the Murrumbidgee River, by which it is nearly surrounded; it contains an area of 150 square miles, or 96,000 acres of land, and on it were depasturing 18,000 prime sheep, though it is represented as capable of feeding from 20,000 to 25,000 sheep, and 1,000 cattle. The second establishment comprised an area of 65,000 acres, or 101 square miles; the whole well watered with creeks and springs. 16,000 sheep were then grazing there, but the runs were capable of feeding 25,000. The third establishment comprised an area of 70,000 acres, or 109 square miles, on which 20,000 sheep and 1,000 head of cattle were depasturing. This, also, was watered by the Murrumbidgee River. The fourth establishment comprised a compact block of about 50 square miles, or 32,000 acres, with a separate block on the banks of the Murrumbidgee, of about twelve or fourteen square miles, or 8,960 acres. 14,000 sheep were depasturing on it, but it is represented as capable of bearing 20,000. That is to

say, this one property contains an area of upwards of 320 square miles, or 270,000 acres of land.

If this sale had taken place a few months earlier, there would have been appended to the advertisement an announcement that the pre-emptive right—that is, the absolute right to purchase the whole, or any part of the land, at the upset price of £1 per acre—would pass to the purchaser of the stock; but a recent despatch from the Colonial Secretary to the Governor of Victoria, which I shall have to notice presently, had at the time somewhat shaken the public confidence in the security of the squatter's tenure, and this arrangement as to the land was not pretended to be made.

This, as I have stated, is but one instance of the general state of things in New South Wales and Victoria. The squatters have possession of the great bulk of the available land accessible to the settler. They claim a right of holding it, at little more than a nominal rent, for a certain number of years; and, at the expiration of such term, of purchasing the fee-simple of such parts of it as they choose, in blocks of one square mile, at the price of one pound per acre. It must be obvious to every one that they would only select for purchase the best lands, which would have the result of their retaining uninterrupted possession of the poorer lands, in the immediate neighbourhood of those plots, at the old nominal rent. But, indeed, whatever may have been the value of land before the discovery of gold in Australia, it is certainly, in the most distant localities, worth from three to four times more than it was prior to the discovery; so that every acre which would have been purchased under the



supposed pre-emptive right at one pound, would now be worth between three and four pounds, at least; and, if it were not for the conditions of which I complain, they would be—as all other lands are—put up to open competition, and realise their true value.

The effect, therefore, of the admission of the claim set up by the squatters, would be to make that class the monopolists of land throughout the interior of the country; for no man could afford to cultivate land for which he would have to pay four or five pounds per acre, while, in his immediate neighbourhood, there was located a landholder who had purchased his one, two, or three hundred thousand acres, at one pound. I do not mean to say, literally purchased the whole quantity; but he has picked the eyes out of his run, which amounts to the same thing—that is, selected sections here and there, to command the water and other natural advantages, thereby rendering competition to his holding such an immense task quite futile.

But let us see on what this preposterous claim is based. An Act of Parliament—the 9th and 10th of her present Majesty, chapter 104—enabled the Queen to demise, for any term of years not exceeding fourteen, any waste lands in the Australian colonies; or to grant a license for the occupation of such lands for a similar term, reserving such rent or services as should be prescribed by regulations to be afterwards issued. The Act further enabled her Majesty to make rules and regulations for the purpose of carrying the Act into effect; and especially provided that no land should be sold otherwise than under the already existing law, *except to persons who should be in actual*

*occupation thereof, under a demise or license authorised by this Act.* Upon this last clause, I believe, the squatters rest their claim. The same Act enabled the Queen, by order of Council, to delegate to the governors of the respective colonies the power requisite to carry its provisions into effect.

This Act was passed on the 28th of August, 1846, and came into force on the 1st of May, 1847. On the 9th of March, 1847, the rules and regulations under which the squatters now occupy their lands were framed by the Queen in Council.

The settled districts comprehend the nineteen proclaimed counties; the reputed counties of Macquarie and Stanley; the lands within a distance of twenty-five miles of Melbourne; the lands within a distance of fifteen miles of Geelong; the lands within ten miles from each of the following townships:—Portland, in the county of Normandy; Allerton, in the district of Gippsland; Eden, in the county of Auckland; Bathurst, in the county of Roxburgh; and Wellington, in the county of the same name. Likewise, the town at the head of the navigation of the river Clarence; the town of Macquarie, in the county of Macquarie; the town of Ipswich, in the county of Stanley.

The settled lands also comprehend all lands within a distance of three miles from any part of the sea, throughout the extent of the colony; the Glenelg, from its confluence with the river Wannon to its confluence with the river Crawford; the Clarence, at a distance not less than ten miles above the township, and not less than ten miles from the sea. Lastly, the Richmond River, at a distance not less

than twenty miles from the sea, measured along the course of the river.

The intermediate districts comprehend the lands lying within the counties of Bourke, Grant, and Normandy, in the district of Port Philip—not before included in the settled lands; also all the lands in the county of Auckland, and in the entire district of Gippsland—not before included in the settled lands; also any counties of which the boundaries should be fixed and proclaimed before December, 1848. The unsettled districts comprehend all the lands in New South Wales, except such as are comprehended within the limits of the settled and intermediate districts.

Different regulations are imposed with respect to each different species of land. Those regarding the unsettled districts come first. In these the governor is empowered to grant leases for terms not exceeding fourteen years, for pastoral purposes, with permission to the lessee to cultivate so much of the land comprised within the runs, as may be necessary to provide grain, hay, vegetables, or fruit, for the family of the lessee—but not *for sale or barter*. Each run is to be capable of carrying at least 4,000 sheep, and is not to be let at a lower rent than £10 per annum, with an addition of £2. 10s. for every additional thousand sheep which the run is capable of carrying. In fact, the runs are let at that rate and no higher. I need not give the particulars of the various regulations with regard to points of detail, but will content myself with those that have reference to the powers of sale or purchase of the lands, either during the lease or after its expiration. It is stipulated, then,

that "During the continuance of any lease of lands occupied as a run, the same shall not be open to purchase by any other person except the lessee thereof. But it shall be lawful for the governor of the colony to sell to such lessee any of the land comprised in the lease granted to him, provided the land sold to such lessee shall not be less than 160 acres; and that the price to be paid shall not be below the general minimum price of one pound per acre." Then, with regard to sale on the expiration of the lease, it is provided that "The previous lessee shall have the option of purchasing the land at its fair value in an unimproved state, which shall never be estimated at less than one pound per acre. If declined by the previous lessee, the value of any improvements on the land offered for sale is to be ascertained by valuers, and the upset price is to consist of the joint value of the land and the improvements; and if the land be sold, the amount of the improvements is to be paid over to the lessee." Right is secured to the governor to make grants or sales of lands, comprised within the leases, for public purposes—such as churches, schools, parsonages, high roads, railways, public buildings, burial-grounds, or for the purpose of digging for coal, iron, copper, lead, or other minerals.

With regard to lands situated within the intermediate and settled districts the regulations are the same, except that whereas in the former the leases are not to exceed eight years in duration, in the latter they are to be annual only.

Now, in consequence of the difficulty in surveying such immense tracts of country as are at present occupied by the squatters, very few leases have been

granted. But the sheep and cattle have been allowed to occupy the runs, on payment of the rent of £2. 10s. for each 100 sheep. The parties so occupying doubtless have an equitable title to leases ; but they are not satisfied with this simple right—they claim first to have the leases dated from the time of their being formally granted, and not antedated as from the time when they first occupied the runs—in my opinion, a most unjust demand. Surely, if they found their claim on the fact of their being lessees in equity, they cannot pretend that their lease has not been running during the time of their occupation—that is, in the generality of cases from the year 1848.

Again, as has been stated, they claim the absolute right of pre-emption at the upset price of one pound—though, in the passage just extracted from the Government regulations, it is expressly stated that they are to have the option of purchasing the land “at its fair value.”

We now come to a very important consideration. It is in contemplation, as soon as the new constitution of the colonies is settled, to entrust to the Colonial Legislature the entire management and disposal of the lands of the colony. Should it rest with the squatters—and they, in fact, chiefly control the representation of the colony—there can be little doubt, I think, but that they will either recognise the claims of those in their own interest, or at least award them compensation. It is to be hoped, however, that the whole question will be finally settled by the Home Government before such a dangerous power shall be vested in persons who have so deep a personal interest in its exercise. That this is probable, may be inferred

from the Duke of Newcastle's despatch to the Governor of Victoria, dated the 13th of November, 1853. In that despatch the whole question is temperately and freely reviewed, with great ability; and it is there stated that the real purpose of the Order in Council above quoted was, "to give encouragement to these engaged in pasture pursuits. It was intended to give them adequate use of the land, for the purpose of their industry, and protection against disturbance in it. It was not intended to give them advantages beyond other members of the community, towards becoming purchasers of Crown lands, except to the very limited extent required for their actual accommodation; still less was it intended to enable them to become speculators in land, purchasing on terms peculiar to themselves, in order to sell again in the general market. And least of all was it intended that their pastoral occupation should stand in the way of the development of general population and industry, and of those facilities for the acquisitions of land by the public at large which are essential to that development."

I need not quote further from his grace's despatch; suffice it to say that, in accordance with the above clearly-defined principles, he decides both against the squatter's claim to leases to be dated from the time when surveys shall have been actually made, and against their claims to a right of pre-emption; first on the above general grounds, and secondly, on the absence of any clause in the regulations, compelling the governor to sell the lessee any land on his demanding it.

The sale of land for agricultural, as distinguished from pastoral purposes, is now regulated by the Act of

Parliament of the 5th and 6th of Victoria, chapter 36. I will not enter on a consideration of any of the provisions of that Act, but will merely describe what is the practice under it.

The Government, from time to time, notifies, by proclamation or otherwise, its intention to sell land, specifying the exact number of lots to be sold, with the situation and extent of each.

The time and manner of bringing forward lands for sale, as well as the size of the allotments, are matters reserved for the arrangement of the Government, on the report of the surveyor-general. But it is notified in the regulations that grazing lands will be sold by auction in sections, never exceeding 140 acres, or one square mile, and that lands suited for cultivation, or likely to be purchased for small farms, and which will be designated as "special country lots," will be sold in portions of from 20 to 320 acres. Persons may, indeed, make application to have particular lands surveyed, and brought forward for sale; but such applications are discouraged, owing to the inconvenience thereby occasioned to the Government, and the expense to the surveyor-general's department.

The great objections to this part of the present land system are two; first, the difficulty of getting lands required for cultivation brought forward for sale at all; and, secondly, the fixed upset price of £1 per acre. The former evil can only be remedied by increasing the staff of the surveyor-general's office, and appointing officers whose special duty it should be to make special surveys in any parts of the settled districts where such surveys should be specially called for. To prevent idle or unnecessary applications, the

applicant might be required to contribute towards the expense of the survey, such contribution to be added to the upset price of the land. The second evil can only be remedied by a repeal of the enactment that established it.

After the account of the gold fields spreading over New South Wales and Victoria, given in a former chapter, it cannot be doubted that abundance of gold is to be met with in each of the districts above described; that is to say, on the settled, the intermediate, and the unsettled lands. We have a right to suppose, moreover, that much is to be found on lands the property of private individuals. In almost all instances where this last has been the case, I should imagine that they must have become private property originally under free grants from the Crown, for it is incredible that any person should have given £1 per acre for land for the most part useless for agricultural purposes, at a distance of from 100 to 200 miles from Sydney; for, however rich the land might be, its distance in those days made it valueless except for grazing. Of this description is the land now belonging to the Wentworth Gold Mining Company, formerly the property of Mr. Wentworth. With the owners of such land it was not a very easy matter for the Government to deal; for though, very shortly after the discovery of gold in New South Wales, a proclamation was issued claiming all gold and ore containing gold as belonging to the Crown, yet it was scarcely possible in so vast a territory either to check the search for gold or to seize it when collected. This difficulty, however, and others of no less magnitude, were met and dealt with by the



Government with great tact, moderation, and sound judgment. It will not be necessary for me to describe the various regulations made from time to time with respect to the liberty of working for gold. The position in which the Colonial Government was suddenly placed by its first discovery was doubtless one of great difficulty; but, its conciliatory, yet firm conduct, co-operating with the loyalty of the people, enabled thousands of all ages and ranks employed in the hitherto almost untrodden wilderness to live in open tents, and often in the open air, with not only as much, but greater, security than in the best regulated city in England.

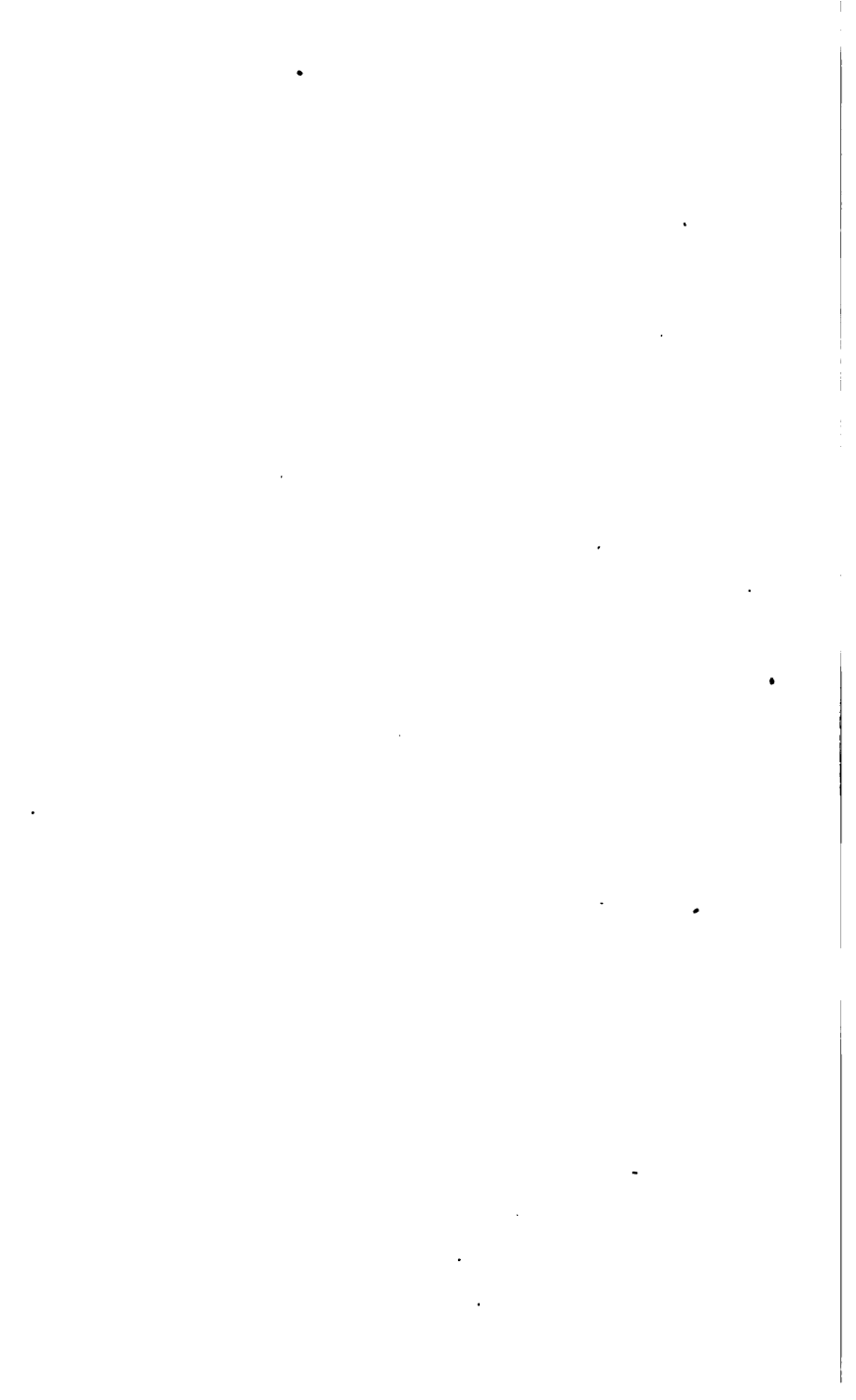
The regulations now in force relate, first to the search for gold in the alluvial soil, and secondly to quartz-crushing. For permission to dig and work for gold on Crown land a fee of 10s. per month is paid, and the applicant receives a license; he is, of course, subject to local rules, made for the common benefit of all. Quartz-crushing companies pay two-and-a-half per cent. of the gross proceeds, and are also subject to supervision and local rules.

In case of any aggression or intrusion by one digger on the claim of another, a commissioner immediately visits the spot and decides the question at once, much quicker and quite as equitable as if done at the Mansion House in London by the Lord Mayor in his robes.\*

I have now completed, to the best of my ability, the task which I had proposed to myself. Commencing

\* Whilst these pages are passing through the press, I perceive, by late accounts from Australia, that the Government regulations are undergoing modifications, the general effect of which will be much to the advantage of the gold diggers.

with a brief outline of the early discoveries in Australia, I next gave some particulars, I fear very imperfect, of the gold mines of the ancients, and of the principal and most interesting discoveries in South America. I next gave a simple narrative of my own doings in California, and the important discoveries it fell to my lot to make in Australia. In another chapter the intending gold-digger will have found the most accurate and useful information it was in my power to give as to the best method of working for gold; and, finally, when he has amassed enough to invest in Australian lands, I have informed him what interests he will find opposed to his own, and under what regulations he will be enabled to purchase. It was my wish to have added some words of advice to those of my readers who might think of emigrating to Australia; but the views with which different persons leave their homes in search of a better fortune in another clime are so various that I was diffident of attempting, within the moderate compass I had prescribed to myself, to give counsel of the nature and to the extent which would be practically available to all classes of emigrants; and therefore abstained from a task full of responsibility, for which the time and means at present at my disposal did not fit me. If, on some future occasion, I shall have the opportunity of supplying this, and many other deficiencies with which this very unpretending volume may be charged, I shall be but too happy to avail myself of it.



NEW THEORY  
OF  
THE ORIGIN OF GOLD:

By SIMPSON DAVISON, Esq.

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IN, LETTERS ADDRESSED TO MR. HARGRAVES.



# NEW THEORY OF THE ORIGIN OF GOLD:

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## LETTER I.

SIR,—I address to you, in writing, the theory I lately explained verbally, relating to the distribution and deposition of alluvial gold, and to the presence of gold in quartz veins, which theory you were then pleased to say was more rational than any you had previously heard advanced.

I do so with more satisfaction, because I have long known your consistently maintained contempt for the vague conjectures of speculative geologists; and your incredulity having led to results of such immense magnitude, contrasts strongly with the faith of those, who, believing in the sufficiency of science (myself of that number), concluded—because amongst a host of geologists, who had either examined or reasoned upon the geology of Australia, none had ever confidently declared or proved it to be rich in gold fields—that therefore gold existed only as it had been occasionally

found in small specimens, or in alluvia of extreme poverty.

I write to you consequently as to one perfectly unbiassed by any prejudices that cannot be sustained by an appeal to the evidence of Nature.

Almost all men engaged either in gold-digging or in studying geology form conjectures as to the origin of the precious metal—from the most humble wielder of the pick and shovel, to the most learned professors in Europe—and, I may be excused for adding, with almost equally unsatisfactory results.

I have constantly endeavoured to avoid forming hasty conclusions—rejecting as groundless, at various times, a variety of crude hypotheses—yet I have always reflected and reasoned, more or less, on this interesting subject; finding it an agreeable study, both when I have been occupied in the depths of the earth where the mysteries of Nature are revealed in her secret laboratories, and when travelling over superficial auriferous areas. Latterly I have been more ardent and systematic in my investigations, from a growing conviction that the subject involves questions of real practical moment. I have visited or resided at almost every principal digging in California, in Victoria, and in New South Wales. Coupling this experience with a previous knowledge of the received principles of geology, I am conscious of possessing advantages, in treating of the subject, that but few men have enjoyed.

I believe Sir R. I. Murchison first advanced the hypothesis that alluvial gold has been produced by “the natural abrasion or grinding down of quartz veins,” an opinion that almost every geologist, writer,

lecturer, and newspaper correspondent has adopted; but although its supporters present so formidable a numerical array, it is but an individual opinion adopted without challenge. All these geologists seem to labour to reconcile Nature to Sir R. I. Murchison's hypothesis, rather than to judge from Nature whether the hypothesis be true or false. I am decidedly of opinion—and I have often heard you express a like incredulity—that the hypothesis is not a true one of universal application, and many reasons for such an opposite conclusion will be found in the statements I shall make in support of my own views.

Sir R. I. Murchison's discovery that the gold was only deposited in the veins of the Ural rocks just previously to the formation of the auriferous drift, and that this drift is newer than the sands and gravels of the old *Palæozoic*, secondary or tertiary rocks, is most unfavourable to his own hypothesis. The abrasion or grinding down of so hard a rock as quartz cannot, then, have been the slow work of many ages, but would have been performed in a short geological period. Gold, therefore, is more likely to have been derived from a softer matrix than quartz rock.

My theory is this—that *all alluvial gold has been distributed and deposited by means of a perishable lava; and that quartz veins, as well as some other dykes traversing constants, have been the fissures of discharge*, the only remains of the decomposed lava being gold, quartz and other pebbles, clays, and ferruginous earths; because:—

1. Alluvial gold has often a fused appearance, and frequently presents a cellular or a ragged surface, such as must have been destroyed by abrasion.



2. It is found in schists, in such shape and position that no mechanical force could possibly have placed it there.

3. It is found rich along present rivers, creeks, and watercourses, showing the configuration of the bedding rock beneath the auriferous drift to have been the same at the time of its deposit as at the present day.

4. It is found rich in the neighbourhood of volcanic disturbance, and where quartz veins and trap dykes traverse certain schists and granites called constants.

5. Gold is also found in quartz veins; and quartz veins are admitted to have been filled by mineral fluids or vapours.

The reports of our colonial geologists frequently represent the alluvial gold as having "undoubtedly been disintegrated from the neighbouring quartz veins," or affirm it to be "a well-known fact that quartz is the chief matrix." It appears to me very doubtful, Sir, that gold has been disintegrated to any great extent from quartz veins; and the conjecture that quartz is a chief matrix from which gold has been derived, is by no means an ascertained fact.

Mr. Stutchbury, in reporting on the Wentworth gold field, says, "That its original site is in the quartz rock immediately adjacent is evident from the unabraded appearance of the gold." That the gold in that locality has never been subject to abrasion is clear to all who know its peculiar character; but it is not evident that its site was ever in the adjacent quartz rock; for, unless by abrasion, by what means was it released? Moreover, the adjacent quartz, if auriferous at all, presents no such rich quality as to

lead to the inference that atmospheric influence alone had disintegrated quartz of such poverty, and left alluvial gold so abundant. No, Sir, the quartz vein was the fissure of ejection of a perishable lava, which lava, on decomposition, left the gold it contained in its present unabraded condition. The peculiar honey-comb rock of these diggings is the lava imperfectly disintegrated; the brown ochreous matter with gold, a few pebbles, and earthy matter, are all its other remains.

The secretary of the Great Nugget Gold Company, Mr. J. S. Mitchell, in a report of their claim, says:—"The gold found in the creek in the alluvium near the vein, is not so water-worn as that found further down;" and he has no reason to think, from any gold he has seen, that it is produced in any other than a quartz matrix. The hydrodynamic force required to roll gold along, with other drift, a short distance down the creek, must have been very insignificant, compared with the powerful long-continued abrasion necessary to disintegrate gold from so exceedingly hard a rock as quartz. No, Sir, the gold came from the fissure of the present quartz vein; but it has been released from a matrix much softer than quartz—from a perishable lava, which has left behind only gold, quartz, and other pebbles, and a *débris* of clay and earth. The gold is less water-worn near the vein, because it has not rolled after congelation; and much of the gold lower down the creek appears water-worn, because it congealed in the act of rolling in a flux of matter, that did not cool into hardness at the same moment.

The hills that surround Mokelumne Hill in Cali-

fornia consist of a soft white felspathic sedimentary lava. Professor Blake, an American writer, calls it a "stratified, soft, and friable sandstone, lying perfectly horizontal over the vertical edge of slate rocks;" and Dr. Trask describes it as "a volcanic tufa, overlying auriferous drift." I suppose it to be andesitic or albite lava, and under it gold is found in abundance, at a depth sometimes exceeding 100 feet; below the lava are found occasional beds of soot-balls, and interstratified are layers of rounded pumice-stone, showing its volcanic origin, and that some vents have ejected dry matter simultaneously with the discharge of lava.

The pipe-clay of Victoria, a soft felspathic clay slate, probably an albite clay slate, *always underlying gold*, presents a lithological character closely resembling the lava of Mokelumne Hill, under conditions widely different. These localities being remarkably rich, both the rocks are entitled to far greater consideration as constants than they have yet received from geologists. It is the albite, either as schist or lava—does not occur in California in other localities than the one I have mentioned, nor in New South Wales at all, unless a white bedding rock at Tambaroora can be considered as an allied rock; but in Victoria it is almost everywhere present on the gold fields. It is very different from the white alluvial plastic clay that diggers sometimes call pipe-clay.

French Hill is situate two miles from the Mokelumne River; between the hill and the river is a steep gulch, found to be very rich at the time of its discovery, the gold reposing on a schistose bed, and intermixed with a small quantity of drift. On follow-

ing the deposit of gold up the gulch, and arriving at the foot of the lava hill, the auriferous bedding rock was found dipping into the hill. Thus was first discovered the auriferous character of the lava hills, appearing as if a perishable lava had overflowed the highest ridge of the bedding rock at the foot of the lava hills, bearing gold along its course down the gulch, and as if a less perishable lava had remained and formed the existing hill. Stockton Hill, on the opposite side of the valley, presents similar phenomena; the plurality of auriferous beds, or the second and third bottoms in that locality and at Ballarat, in Victoria, show a repetition of auriferous lava streams. The lava sometimes passes into a sort of wacke, or into a dark red or yellowish-red rich auriferous clay, exceedingly tenacious and insoluble; these are called lavas by the diggers there, and I consider them the sediment that has not assumed the form of scorice of a larger body of lava. The same clays are common at Bendigo, and at the Wentworth diggings, and are so extremely tough that it is almost impossible to dissolve them without the aid of machinery.

In schistose rocks, diggers find gold in such shapes, and so exactly conformable to the containing rock, that it must have been melted into it, or otherwise, as some have supposed, it must have grown there; that is to say, they suppose schist to be a matrix, in the same way as others have considered granite to be a matrix, or that gold has been derived by the separation or segregation of mineral particles from the rocks containing it. Dr. Trask implies that schist is a matrix, when he says, "in addition to its (the schist) containing gold as an integral part, *when unassociated*

*with the quartz veins*, it (the schist) frequently becomes the retaining medium of this metal (gold) when in contact with those veins." Dr. Trask here records the phenomena, but does not account for them; and, speaking of gold as an integral part, shows he does not adopt the abrasion hypothesis. I think you will remember I have said to you frequently in California, that schist was a matrix if granite was; but neither one nor the other is a matrix. Sir, Mr. Rudder (now the superintendent of the Australian Agricultural Company's gold fields) used to maintain, and, as he considered, proved to me at Forster's Bar, the hypothesis of granite matrices. The Rev. W. B. Clarke also holds the same opinion. I do not, however, consider granite to be more a matrix than schist, since it is never found in granite beyond a certain depth, seldom as deep as two feet; the specimens shown as granite matrix is gold in granite *detritus*, unmixed with foreign matter, and accidentally cemented. The theory now offered confirms Dr. Trask's observations, and accounts satisfactorily for the vicinity of quartz veins being rich in gold.

Mr. Selwyn, in reporting on the geology of Victoria, says:—"Gold has been formed in or near quartz veins which are seen traversing palæozoic strata." Like Dr. Trask, he doubts of their being the only matrix, and when he speaks of the drifts being "derived by the decomposition, breaking up, and spreading abroad of these quartz veins along with the ordinary sandstones and slates," he implies the latter are *matrices near quartz veins*. He terms the constants palæozoic strata, without, however, seeing

any fossils; in my experience I have not seen or known of any fossils found underlying gold deposits, and lithological character alone not being sufficient to determine a palæozoic rock, I question the propriety of applying such a term. His adoption of the hypothesis that quartz veins are always richer at the surface, and the inference that the deposits consequently occupy the lower positions of the drift, is not satisfactory. The gold in Victoria is nearly all found richly and thickly embedded on the base rock, and in the superincumbent strata it is frequently difficult to find a tracing of gold through strata of some thickness. His statement that "the auriferous drift is composed of angular and partially rounded fragments of slate, quartz, &c., being seldom water-worn, with a few local exceptions," I do not think is correct. At Bendigo, the drift on the flats is sometimes angular, but the succession of white hills, containing by far the principal body of drift, is composed of quartz pebbles as rounded as they can possibly be; perfectly rounded pebbles is the rule, and partially rounded fragments the exception. The supposition that quartz veins are always richer nearer the surface I shall treat of subsequently, in speaking of quartz veins, and show the cause of their sometimes being so. All the phenomena, Sir, yield to the perishable lava theory.

I recal to your remembrance, as an instance of the impossibility of mechanical deposition, the piece of gold we found on Wood's Creek, about twice the size of a guinea, thin as a wafer, closely wedged in fissile clay slate. It could never have been rolled and placed there by ordinary hydrodynamic force, owing to its extreme delicacy.

The generally flat character of all slate gold, forbids the supposition that it was abraded from quartz veins, rolled and deposited in a cold state by cataclasmal agency; for scarcely any conceivable superincumbent weight of water and drift could have so flattened it after its deposit. No, Sir, it was deposited there in a molten state.

Granite gold is usually either in very thin flakes or in small solid grains. The first are formed by melted gold spreading and cooling on the sides of the crystals in granite, and the second in the interstices of granite *débris*; but it never contains gold in those thicker grains with two flat sides—such as the schists produce.

Mr. J. B. Jukes, in a lecture at the Museum of Practical Geology in London, says, the letters of diggers speak of gold as appearing as if it had been fused; and adds, it is probably a mistake. No, Sir, it is not a mistake. I will instance the nuggets from the McIvor diggings, in Victoria. They appear as if one side was yet in a state of fusion, with the other side indented, as if just cooled upon a sandy or gritty floor.

He also makes a common mistake—but a very reasonable one—in saying, the beds of rivers are large natural cradles, and, where they are crossed by a bar of rocks, gold may be looked for above the bars, as in a digger's cradle. The exact reverse is almost invariably the case—the sheltered, or lee side of trap dykes of obstructing rocks, is richer in gold deposits than the weather or stream side.

Gold deposits are found rich along the courses of the present rivers and creeks. Sir R. I. Murchison says, the auriferous drift of the Ural is composed of ancient gravel, and must not be confounded with that

produced by causes now in operation; whilst Mr. Stutchbury, in a report of the Turon, expresses a belief of the sufficiency of existing influences operating through a long period of time, undisturbed by great convulsions, that these influences have disintegrated auriferous quartzose dykes, and rains and floods have assisted the release of gold from its quartz matrix, and washed it into the lower levels, where it now rests.

I agree with the former—that the influence of existing destructive agencies, without a radical change of surface, does not account for the auriferous drifts, and wonder the accumulation of drift in the valley of the Turon, forming hills and terraces, above the reach of any present floods, could have been referred to a deposition by agencies now in operation, without presupposing a change of elevation. My theory teaches that the valley of the Turon, at the time of the gold deposit, was filled with drift by means of a perishable lava, its remains now forming the “ancient gravel.” Through this gravel the river has worn its present channel, and made the recent gravel.

Quartz veins, being rare on the richest part of the Turon, about Sofala, and also on the rich Yuba, in California, the fissures there have not, apparently, filled with silica, after their auriferous discharges. Below Monday Point, on the Turon, on the opposite bank, some height above the river, I observed a long fissure parallel with the strike of the schist, that had apparently contained rich deposits of gold: this, probably, was a fissure without quartz, that had discharged auriferous lava. I dare say you will remember it.



Gold is found more abundant in rivers, creeks, and gullies, because they were filled with perishable lava, containing gold ; which, also, after and during disintegration, facilitated the rolling of gold from the banks into the lower levels. It is often hard to believe that gold can have rolled over a fissile vertical schist by aqueous agency alone. Even supposing the schist to have been worn down a considerable depth, a fissile slate would continue renewing its crevices, and into these the gold would find its way.

Schistose formations, traversed by quartz veins, or trap dykes, are the most prolific in gold. In a process of abrasion that would grind down the quartz veins, the quantity of other rock ground down at the same time would be hundreds of times greater, as it occupies an infinitely larger superficial area. Much of it would also be indurated. The boulders and pebbles so derived from the hard rock other than quartz, and united with auriferous drift, ought far to exceed the quartz *detritus*. After denudation the harder rocks are usually left standing some height, because of the quicker disintegration of the softer containing rocks ; but the very hard quartz veins are level with the surface, or rarely found a few feet high. And, further, the quartz and gold specimens found in alluvia are either pieces of gold with a little quartz attached, or pieces of quartz rich in gold, but hardly ever rounded quartz pebbles or boulders with a very little gold—a small speck or two. If the rounded quartz had been abraded from quartz veins, amongst the countless number of pebbles such poor specimens would have been found plentifully. No, Sir, the auriferous drift of the White Hills, at Bendigo and

elsewhere, is a volcanic or peculiar trap quartzose conglomerate, and not, as generally supposed, a drift produced by denudation, and deposited by the ordinary action of water; but, allowing all rocks other than quartz to have been entirely disintegrated, where are the remains in mud, shale, or whatever form deposited, hundreds of feet thick as they ought to be, by the abrasion hypothesis in beds newer than the tertiaries? Sir R. I. Murchison affirms the auriferous drifts are newer than the tertiaries; Mr. Selwyn attests they are of very late tertiary date; and Dr. Trask says, in speaking of the bones of gigantic mammalia found in the auriferous drift, "during their existence in the tertiary period a fresh outbreak of volcanic force took place, and its fiery ravages swept from existence the entire race that occupied its surface, and inhumed their remains beneath the scalding flood." I suspect the scalding flood to have been the auriferous lava.

The drift, consisting almost entirely of quartz pebbles, is a bed over fifty feet thick, at Bendigo, covering a large area, forming the White Hills; and at Ballarat the drift exceeds a thickness of 100 feet. In these schistose formations, Sir, the fissures, now quartz veins and trap dykes, have discharged gold, and the interstices of the schists have been the receptacles. The deposits on granite have been formed in like manner. The discharges from fissures in granite have usually been of greater poverty (the diggings in granite near Braidwood are the richest I have known), and the gold distributed by means of some fluid, that has since disappeared, which I have termed a perishable lava.

The distribution and deposition of gold by this lava having been partly chemical and partly mechanical, its gold presents a good deal of evidence of abrasion, because it may have frequently cooled into solidity before the other fluids, in the act of rolling, and have yet continued to roll, whilst other gold has an unabraded appearance, and is either rough, or cellular, or drop-like, or flattened between slates, because it has settled in a fused state amongst stones, sand, or other solid and settled matter, and has not been rolled afterwards.

Gold is found accumulated so closely to the bed rock (it is frequently all contained in a bed of two inches in thickness at Bendigo), that the superincumbent strata must have been in strange violent disturbance ever to shake it so to the bottom; and the regularity of the strata overlying the gold on the flats at Bendigo and Mount Alexander, of alternately sand and clay, pebbles, clay and sand again, separated by clear lines of demarcation, does not attest such disturbance immediately over the present gold deposits. The only conclusion on the abrasion hypothesis would be, that the gold must have settled first in an auriferous drift, and then have been denuded again, and then the present strata regularly deposited. No, Sir, the gold was generally deposited in Victoria in rich floods of lava, and the superincumbent strata on the flats were deposited afterwards.

Quartz veins are admitted to be cracks and fissures caused by the disturbance and intrusion of igneous rocks, or by the cooling of igneous rocks themselves. Mr. J. B. Jukes says, "To many of these the molten rocks gained access, and filled them up, forming what

are called dykes, and others remained more or less open until subsequently filled up with other minerals. Of these minerals quartz is probably most abundant; besides quartz, many other minerals accumulated in these veins; and among them many metals, such as lead, tin, copper, silver, and gold." The Rev. W. B. Clarke believes the true origin of quartz veins to be caused by "the cooling condensation in fissures of the rocks of silica dissolved in steam, derived from peculiar traps, which may have produced auriferous impregnations as well as siliceous." Sir Charles Lyell says, "Almost every vein has probably been the channel by which hot springs so common in countries of volcanoes and earthquakes, have found their way to the surface."

I suppose whilst discharging the perishable lava with its contents of gold and silica dissolved (the silica, I suppose, has cooled in the act of rolling, in the form of *quartz nodules*, and thus originated the rounded quartz pebbles so abundantly found, instead of their being, as is generally supposed, the produce of denuding processes; or it is possible that, like calcareous nodules in amygdaloids, they may have been formed as siliceous secretions in the cells of lava during its cooling and consolidation, and the foreign fragments are accounted for exactly as geologists account for them in other traps), the silica which might previously have been either dissolved in steam or in liquid, by heat, with proper fluxes, accumulated and usurped in the fissure the place of the perishable matter, as the ejective force became more feeble, and then congealed with its contained metal. Thus, Sir, the auriferous quartz veins were formed.

Trap dykes also have produced gold in like manner, the molten rock having gained access to the fissure, and expelled the silica with its associated metals. Portions of the molten rock may also probably have been removed with the siliceous lava, and formed nodules of trappean character by cooling in rolling, as quartz pebbles have done, and thus originated the numerous rounded trap pebbles and boulders so frequent in auriferous drift.

It is a fact well known to geologists, that although silica is abundantly distributed through nature, it is remarkably scarce in existing volcanic and trappean rocks. This circumstance, so far from being unfavourable, supports my theory; it shows that a separation occurs in fused rocks between silica and its associates and the hornblendic felspathic traps—that there exists a sort of repelling property between the two classes; therefore silica and its associates have been discharged in a lava or peculiar trap of their own separately in the way I have described, and when hornblendic or felspathic traps have been the molten rocks that have filled the fissures, they have not united with the siliceous fluid, but probably expelled it.

The best auriferous quartz veins are not always found amidst the richest alluvial diggings. I account for it in this way. Californians divide them into V veins and into A veins, the letters describing the shape of the vein when cut transversely. The V veins, in discharging great quantities of auriferous lava, have become enlarged at the top; they usually exhibit rich quartz specimens at the surface, and are situate in the neighbourhood of rich alluvia: the A veins, on the contrary, have discharged but little lava or none at

all, and are not consequently situate in the midst of rich alluvia, but yet contain their metal undischarged, and increase or diminish less abruptly in bulk downwards; these, therefore, are far more highly valued.

The Macgregor auriferous quartz vein, on Mitchell's Creek, New South Wales, is an example of an A vein from twelve to twenty feet wide at the surface, and is interrupted without lateral disturbance by a trap-pean hill near its northern terminus; and, as might be expected, is prolific in metal near the hill. I consider this quartz vein, when fluid, has had but a very feeble pressure from below. It forms, to speak geologically, a sort of anticlinal axis to the rocks on either side, and has probably not discharged at all, or if so, not with sufficient force to eject its metal; but the silica with its metals has almost immediately cooled on filling the fissure; the trap, an ophitic porphyry, has in a molten state only partially occupied the fissure, and risen until it formed the present hill.

The following passage from Sir Charles Lyell, on mineral veins, is strongly corroborative of my theory: "We are led to infer that there has often been an intimate connexion between metalliferous veins and hot springs, holding mineral matter in solution; yet, we must not, on that account, expect the contents of hot springs, and mineral veins would be identical. On the contrary, M. E. de Beaumont has judiciously observed, that we ought to find in veins those substances which, being least soluble, are not discharged by hot springs, or that class of bodies, which the waters ascending from below, would first precipitate on the walls of a fissure as soon as their temperature began slightly to diminish, the water, after precipitation,

being chiefly charged with the most soluble substance—such as the alkalis, soda, and potash; these are not met with in veins, although they enter so largely into the composition of granite rock.” Exactly so, Sir; the hot water, holding mineral matter in solution, is the perishable lava, and owes its perishability to the water; alkalis, soda, and potash, and, the least soluble substance is the quartz rock. I think, however, the quartz veins have not been formed by a slow precipitation; but, when the silica has cooled to a certain degree, it congealed all at once—or nearly so: hence the compact character of auriferous quartz veins. By slow precipitation, the silica would, most likely, have formed large and regular crystals at the sides.

Again, Sir C. Lyell writes: “Siliceous and metallic matters have sometimes found their way simultaneously into such empty spaces (fissures) by infiltration from the surrounding rocks, or by segregation—as it is often termed—mixed with hot water and steam. Metallic ore may have permeated a pasty matrix until they reached those receptacles (the fissures) formed by shrinkage.” Yes, Sir; and when the hot water, mixed with metallic ores, had filled up the fissures, it must have necessarily boiled over, if the supply continued. This matter, forced out by steam, or boiling liquid, is the perishable auriferous lava. Silica and gold, having simply found their way simultaneously, quartz cannot, with propriety, be termed a matrix, but only an associated, or twin-born mineral.

The same distinguished geologist further writes: “We are prepared to expect a destruction of what-

ever may once have formed the uppermost part of ancient volcanoes—more especially as superficial parts are always of the lightest and most perishable materials. The abrupt manner in which trap dykes usually terminate at the surface, and the water-worn pebbles of trap in the alluvium which covers the dyke, prove incontestably, that whatever was uppermost in these formations, has been swept away.” This refers to denudation; but the perishability of whatever was uppermost in traps is of importance in its bearing on my theory. In offering the theory, I do not suppose denudation has never taken place; on the contrary, when auriferous lava floods have filled up valleys through which rivers were flowing, before these rivers regained their usual course, they might accumulate bodies of water or lakes, and, overflowing the scoriaceous auriferous lava, assist its disintegration, and produce many phenomena analogous to those produced by denudation.

I think the lava, on cooling, has usually become scoriaceous—the heavier matter, gold quartz, nodules, and foreign fragments, having previously, probably, formed a sediment. The existing evidence of scorix is seen in the honeycomb-rock of the Wentworth diggings, in the lava hills around Mokelumne Hill, and in the inadhesive red earth that so invariably accompanies the kind of diggings called surfacings, as well as the drifts. This red earth is very different from argillaceous clay, and is composed of the small fragments or powder of a destroyed scorix. You will, no doubt, remember how the inadhesive qualities of the red earth on the Yuba rendered it so unfit for damming purposes.



In conclusion, I invite yourself, or any geologist, to point out objections to the theory, premising that it be done with the candour and temper of philosophers seeking after truth, and not with the narrow-minded, straw-splitting disposition of advocates obstinately maintaining opposite systems.

I am, Sir, &c.,

SIMPSON DAVISON.

Sydney, March, 1854.

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## LETTER II.

SIR,—In continuation of the subject of the origin of gold in perishable lavas, I now write to show that the theory is reconcileable with the known laws of chemistry and physical science.

I wrote before with much confidence and an assurance of giving the first outlines of a great truth, deduced from extensive observations of physical nature, and advanced a theory which, I believe will shortly be acknowledged both in the scientific and the popular world; the cue having been given—the foundation of a new system once laid, a consideration of the question by intelligent and scientific men versed in the several branches of abstruse knowledge that bear on the subject, will doubtless before long illustrate the natural phenomena, and prove them by known chemical and physical laws, far more ably than I can ever hope to do.

I write with more diffidence on the present than on the former occasion, trusting that, by treating

only of general principles bearing on the theory unfolded, to direct investigations in a right direction, and hoping that, during your visit to Europe, you will have opportunities, and do me the favour, of calling the attention of scientific circles to the facts stated, and the inferences drawn.

It is always painful to witness misdirected labour, whether the physical toil of the digger, or the mental efforts of the scientific. I have seen with equal regret energetic miners sinking deep shafts in search of gold, in spots where it was most unlikely to be found; and intelligent writers making their observations and reports, based upon false hypotheses, prejudices, and associations.

Geological surveyors and writers in California and Australia have been distinguished for their greater knowledge of the order of supraposition of aqueous rocks and palæontology than of mineralogy and chemistry, the former acquirements being of but limited service in reporting on gold fields, whilst proficiency in the latter sciences is all important; had the theory that gold has been derived immediately from volcanic fluids been earlier known, or even supposed, instead of the abrasion hypothesis, an entirely different set of observations would have been recorded, and a system established as complete and satisfactory as several theories on other subjects now received as established truths.

When some of the early reports from New South Wales reached Mokelumne Hill, Mr. A. Cadwalader, a geologist who had formerly been employed as a Sub-Commissioner by the United States Government, in an expedition sent to explore the copper-

mining districts of Lake Superior, remarked to me that it appeared gold in Australia was found more associated with hornbendic, and in California with felspathic rocks. One of those reports of the Rev. W. B. Clarke's, dated Jineroo, 21st October, 1851, concluded some remarks in these words:—"Mica, therefore, and felspar, are not necessarily connected with gold; but I think hornblende and quartz must be so either alone or together." On my subsequent arrival on the gold fields of Victoria, I saw with surprise the bedding rocks of the gold deposits were there more felspathic than those of California.

At this period my observations were tending to a directly opposite conclusion, and pointing toward rocks of the felspar and mica families (the latter including chlorine, talc, and mica schist, &c., and the former the white felspathic schist of Victoria, and the lavas of California, &c.), as intimately connected with gold; but since the perishable lava theory ripened to conviction, it is to neither of these compounds exclusively, but to the agency of two primary elements, that I refer all the phenomena attending the deposition of alluvial gold.

I say two elements, for simplicity of illustration, and because their influence is most obvious; but each is only the type of a class that have with other elements sometimes been substitutes, or auxiliaries, not easily seen in the present state of our inquiries. One class is termed *halogens*, and includes chlorine, fluorine, bromine, and iodine; and the other class is *alkaline metals*.

The two elements are the alkaline metal *sodium* and the acid-forming element *chlorine*.

Felspathic rocks are divided by Sir C. Lyell into two classes, the more common kind potash felspar, and the rarer kind soda felspar, or albite.

I have already stated, in my former letter, that the soda felspathic schist *underlying* gold deposits in Victoria and the trachytic or soda felspathic lava *overlying* gold at Mokelumne Hill are in localities the richest in gold of any I have known, and that their importance as constants has not been deservedly noticed by geologists. The soda felspathic constituent is not precisely in the same form in the gold-bearing rocks of New South Wales; but it enters largely into the composition of its more prolific gold-bedding rocks, and probably the friable auriferous granites owe their decayed surfaces to the more readily disintegrated soda felspar occupying the place of the more common constituent of granite, potash, and felspar.

Chlorite schist is another of the peculiarly rich constants; Dr. Trask bears testimony to it in these words:—"Those rocks (slates, &c.) pass into a variety termed chlorite at Bear Valley, Mariposa, and a sufficient illustration of its value will be found in the excitement that prevailed on its discovery." I remember the excitement of the discovery in Bear Valley, and understood gold was found there in amazing profusion.

We have then arrived at the significant fact that soda rocks and chlorite rocks of the felspar and mica families are the richest of all bedding rocks, or constants, of alluvial gold deposits.

I now refer you to the known properties, and their chemical effects upon each other; of the three elements, gold, sodium, and chlorine, and their re-

lation to oxygen, the most destructive agent of metals in general. The quotations are copied from standard authorities.

The disposition of metals to combine with oxygen and form oxides, or rust, is so well known, that I need but remark gold is one of the metals that combines with it least readily, and parts with it most easily. "The oxide of gold gives off its oxygen by slight heat, or by the mere agency of light." Yet gold must have been in combination and solution of some kind; otherwise, had it first appeared on the surface in lava, as melted metallic gold, it would have been deposited in continuous thin sheets, instead of in dispersed grains, as it is now found.

"In chlorine gold ignites, and it is the only means of rendering gold soluble."

"The only solvent of gold is aqua-regia, a compound chiefly of oxygen and chlorine; therefore chlorine is the agent that has held gold in solution in lava."

"The attraction of chlorine for the metals even surpasses that of oxygen. Thus, when this gas is brought into contact, at a red heat, with lime, magnesia, baryta, potassa or soda, oxygen is given off, and a chloride of the metal is generated."

"Gold is precipitated from its solution by lime, magnesia, potash, or alkalis; it is also precipitated by sulphurets, by iron, lead, copper, silver, tin, mercury," &c.; and, "a solution of gold is precipitated by sulphate of iron, or by a solution of tin."

"The metals also precipitate one another after a certain order. Zinc prevails over iron, iron over lead, lead over tin, tin over copper, copper over

silver," &c. Probably any of these metals prevail first over gold.

"Metals are chemically distinguished by forming saline bases with oxygen. Gold and noble metals are the only exceptions to this rule. The affinity of the metals for oxygen varies very greatly between those of gold and platinum, whose oxides may be decomposed by the slightest forces, and that of potassium (and sodium), which will attract oxygen from every known compound."

Alluvial gold is always found reposing on metamorphic or igneous rocks; that is to say, on rocks that have undergone chemical changes, and not on rocks of simply mechanical deposition.

If we consider all these properties of gold in relation to a liquid lava and a subjacent metamorphic rock, we arrive at these conclusions: a hot lava, containing a solution of gold, flowed over rocks containing lime, magnesia, or alkalis; some of its constituent elements, possessing an elective affinity for such bases, passed into combinations with the subjacent strata, transmuting them into metamorphic rocks, and an immediate precipitation of metal gold followed the withdrawal of those elements. Amongst rocks of the mica family, a chemical analysis, by Rosales, of lithia mica from the Ural, gives upwards of ten per cent. of fluorine and one of chlorine; but most frequently the analysis given in geological works does not distinguish the compounds of alkaline metals with halogens from those with oxygen only; and, such compounds being generally soluble, they may have often entirely disappeared by percolation, leaving the bedding rocks partially decomposed or rotten, a

condition in which the richest constants are often found.

The metals alone have naturally precipitated gold from its solution : as proofs of it, the stratum next above gold at Bendigo consists frequently of closely-packed ironstones ; at the Ovens diggings it is tin ; at a small creek you will remember near York Town, California, it is iron pyrites, in large quantities of detached perfect cubes ; and it is perhaps most commonly the magnetic iron black sand so often found in quantity in gold washings. In these cases the gold was not precipitated by the escape of any element into the subjacent rock, nor has any halogen ever necessarily been in their composition. The gold fields proclaim unmistakeably "a solution of gold may be precipitated by iron or by tin."

Water falls from the clouds, through an atmospheric medium, in three forms—in rain, snow, and hail. Gold has been precipitated through the denser medium of lava under three like conditions ; in liquid drops, in congealed grains, and in crystallised pieces—in the last form, like angular hailstones, it is very rare, but is occasionally so found.

In shot manufactories melted lead congeals in globular forms, because it drops through the air into another medium, which has been regulated as to density, distance, temperature, and depth ; without such regulations, lead would assume such shapes as alluvial gold has done.

Gold has always fallen in small drops or grains, large nuggets being liquid drops of gold collected in cavities, the form of which they have taken. When gold exists in large nuggets, it has been deposited at

a higher temperature than when found in smaller grains, and has consequently been longer before arriving at the congealing point, or the temperature at which it would cool into solidity, thus allowing time for larger quantities of liquid drops of gold to accumulate and form one lump.

We see on the various gold fields the drops of gold, though different in size, have been in some degree uniform at the time of each deposit; as the thunder storm of to-day, and the drizzling rain of yesterday generate each a class of equal-sized globules of water, differing widely from the other. At the Ovens, river gold is of the drizzling rain kind; at Ophir, where you first discovered gold, it is of the thunder-storm variety.

The congealing or freezing point of gold is very high, as this comparative table shows. The freezing point of water is 32 deg., potassium 136 deg., sodium 194 deg., tin 441 deg., lead 612 deg., silver 1,873 deg., gold 2,016 deg., iron and platinum above 3,280 deg. Gold, it will be perceived, congealed in the lava, whilst all the remaining ingredients were fluid, except iron and platinum; but I imagine iron was never in so pure a state, so simple a compound as gold, both for this reason and for its position in the order of precipitation; it has always been deposited after gold.

The order of precipitation in auriferous lavas has been, first, gold; second, iron or tin; third, quartz, nodules, or aggregated grains of impure silica; and precipitations of clays (silicates of alumina), and of grains of sand (minute separated crystals of silica), have followed or intervened.

Quartz pebbles, like rounded hailstones, are nodules of crystalline texture, formed by congelation, whilst



moving in a free medium, and not by grinding against solid substances in rolling.

As evidence that quartz nodules have been precipitated, I will mention the New Zealand gold, or rather golden pebbles, such as the specimens in your possession. These apparently come under the class of "partially rounded fragments of quartz;" but on fracture, the gold is seen to be symmetrically arranged; centrally it is alternately small grains, or quartz, and equal sized crystals of gold; towards the outside the golden crystals cluster much thicker all round the surface of the pebbles, and manifest a decidedly systematic structure. They cannot be fragments of a larger mass of quartz, but have been congealed in their isolation. Though of crystalline texture, they convey the impression, as a whole, of being each one large rude crystal. California and Australia might have been searched in vain for such testimony, since gold and quartz are not found so associated in any of their gold fields.

The term clay is often confined in its application by geologists to the sediment of decomposed igneous rocks, of felspar in particular; but clay, being a chemical compound, a silicate of alumina may have been as directly derived from volcanic fluid as felspar itself, or any other indurated rock, when under circumstances favourable for its ingredients to combine in requisite proportions.

I now make some remarks on sodium and its kindred element potassium.

Potassium spontaneously ignites, and burns with great heat and flame when brought into contact with water, and rapidly decomposes it, uniting with its oxygen, and releasing its hydrogen.

Sodium has very similar properties. Both these metals have the most violent elective affinity for oxygen and for chlorine. Sodium combined with chlorine forms common salt (chloride of sodium), and combined with oxygen it forms common soda (oxide of sodium). These are called alkaline salts; "and, in almost all cases, metals may be precipitated by alkaline salts."

Since the discovery of these metals, and their property of immediate combustion on contact with water, geologists have accounted for eruptions of lava (without reference to gold), by inferring that large volumes of water have gained access to subterranean masses of these metals; and I now assume those inferences to be facts.

Lavas may be divided into two classes: those that have crystallised, or become indurated in homogenous masses; and those that have precipitated the ingredients of their composition, the greater remaining mass of which has formed a perishable residue.

Potassium and sodium are distributed through nature thus: Potassium enters largely into the composition of crystalline and indurated rocks, and sodium sparingly; sodium enters largely into the composition of the ocean. Therefore, potassium lavas and rock-fluids have been favourably disposed to crystallisation and induration, and sodium lavas have been favourably disposed to precipitation and perishability, and the perishing of such lavas has caused the accumulation of this metal with chlorine in solution in the ocean, and is one source whence its saltiness has been supplied.

Similar chemical changes that occurred to form other metamorphic rocks also took place in the case

of soda-bedding rocks ; a lava at a high temperature, containing a solution of chloride of gold and of sodium in course of oxidation, passed over strata possessing elective affinities for sodium, and a transmuted soda rock was the result, as in Victoria. The gold has been precipitated by the same agencies as before described, or even by sodium itself, in certain stages of its combinations, since metals may be precipitated by alkaline salts.

In preparing gold for coinage there is added to the melted mass a portion of nitre and soda, for the purpose of *oxidising the base metals* ; a like service has been performed by similar agents during those natural changes and convulsions that deposited alluvial gold.

Lime (oxide of calcium) is an ingredient of the white schists—the rich constants of Victoria (I believe so, but have not seen a chemical analysis), therefore *calcium* has played a part like sodium, either arriving with the fluid, combining with the underlying rock, and leaving a perishable residue of soluble chloride of calcium, (not chloride of lime) ; or it has previously existed in a bedding rock of impure limestone, (carbonate of lime), and the lava at a great heat released its carbon and substituted some of those other elements now fixed in the metamorphic rock by complex chemical changes, not easily followed.

Lime is an ingredient in the serpentines of New South Wales, which are also constants of superior richness, and to these the same remarks will apply—“limestones and other aqueous rocks have been metamorphosed by heat into crystalline schists, micaschists, clay, slates,” &c. (See Lyell's Manual, chap. 35, p. 1) “in the Swiss Alps even *Aysch* (a tertiary limestone)

has been occasionally invaded by plutonic rocks and converted into *crystalline schysts of the hypogeno class*." Chap. 34, p. 453.

Magnesium has been an agent similarly active in rocks of the hornblende and mica families; chloride of magnesium is also very soluble.

The temperature at which gold has been deposited in the first White Hill, Bendigo, has been nearly that of the congealing point of gold or a few degrees above 2,000 Fah., as I ascertained by the following observation. The gold of that hill is in small redounded grains, seldom a pennyweight, and the patches of peculiar richness, are nests of grains without nuggets. In these collections I found small grape-like clusters, of two or three pennyweights collectively, slightly cemented by a transparent silica, indissoluble by washing; and, on breaking up these, I have found on several occasions, a central piece exactly and deeply indented by the surrounding grains. Therefore the temperature has been nearly that I have named; had it been higher, the liquid drops would have coalesced into one body; had it been lower, no indentations would have been made, for gold is not, like iron, a metal that long remains in an intermediate soft condition, capable of receiving impressions, but passes quickly from a fluid to a perfectly hard state.

Another instance of determining the temperature I saw on a slope of surfacings between a hill-digging and a creek, at Mokelumne Hill. In this case it was a tripartite nugget, about two ounces in weight, each piece corresponding with its fellow as exactly as a cast to its mould. They were found a few feet apart. These have approached each other when too cold to unite,

yet soft enough to reciprocate impressions, and have been again separated either in the last effort of a slowly moving fluid lava, or, subsequently, by more ordinary means.

"A triple salt of gold (chlorides of gold and sodium with water) bears an incipient red heat with impunity, and requires for melting a distinct red heat, and keeping it up at least two hours. Analysis of 50·5 grains: gold 25, chloride of sodium 7·5, chlorine 9, water 9." (Thomson).

The combinations have, doubtless, been complicated, and other elements, resembling chloride, in their relation to gold, have been auxiliary or substituted agents; and, besides sodium, many other metals have been in commixture with lava, most of which have oxidised, mineralised, decomposed, and disappeared with greater or less rapidity. Gold alone, not being acted upon by the oxide of the atmosphere, has retained its original metallic purity. As a proof that many metals have appeared at the same time, I found, in the Macgregor auriferous vein, gold, argentiferous galena, blende, titanite iron, arsenical pyrites, besides copper and iron in compounds with oxygen, carbon, and sulphur, and no doubt there were other rarer metals I am unable to distinguish.

The term *constant* is convenient for expressing a gold-bearing rock; but, for the reasons stated, the transmutation of subjacent rocks by auriferous lavas is a cause of the characteristics of constants; the constants are not the cause of gold, and they have been transmuted from the surface by overflowing lavas, and not solely by the lateral influence of dykes, and of underlying igneous masses.

For convenience, too, the terms *fused rocks* and *dissolved silica* have been used in my last letter, and by other writers, but improperly so. It is not clear the ingredients of volcanic fluids consist of such rocks as we are familiar with, that have been melted over again; but possibly the elements derived from unknown depths entering into their first combinations—silica, for instance—may be the simple element; silicon combining for the first time with oxygen, and forming silica (silicic acid), instead of its being “rocks of silica, dissolved by steam or by heat.”

Platinum is the densest form of matter with which we are acquainted, and its specific gravity is 20·98. The lightest metal is potassium, and its specific gravity is 0·865. The next two corresponding dense and light metals are gold and sodium; the specific gravity of gold is 19·3, and of sodium 0·972.

Sodium, then, is lighter than water, and its natural position was on the surface of fluid lavas; and, as we do not know what has been the relative proportion of water and sodium in the lavas, it is not easy to determine whether the perishable and superficial laws on cooling has been a partially oxidised sodium, that continued its oxidation from the atmosphere, after exhausting the water of its oxygen; or whether water was in superfluity, and a saline liquid resulted. The perishable lava may sometimes have formed a friable scorïæ, and have been removed by slight denuding forces; or sometimes an efflorescent, or a deliquescent solid; or sometimes a saline liquid, accordingly as particular elements have preponderated. Around Mokolumne Hill it has formed a friable granu-

lar soda felspathic rock (a silicate of alumina and soda), apparently identical in lithological character with the underlying felspathic rocks, or pipe-clays of Victoria. But it is an exception to the rule; most frequently the lava has disappeared.

Sodium possesses a most energetic affinity for both oxygen and the halogens. Therefore, when the bedding rock contains a trace of the latter elements, they appear to have been in the lava in excess beyond the quantity sodium can absorb, and the perished lava has been a compound analogous to common salt (chloride of sodium). When the transmuted rock is of the soda kind sodium has been in excess over the halogens, and some of the sodium has, by means of heat, combined with the oxygen contained in the bedding rocks, and the greater remaining part of the sodium has combined with oxygen derived from the water it decomposed, or from the atmosphere, and a compound analogous to common soda (oxide of sodium) has resulted.

I need hardly remark, the perished lavas have not been common salt and common soda in their integrity, but compounds modified and varied infinitely by other elements and circumstances.

Gold has probably been formed only in subaerial lavas, the elements contained in sea water being in proportions unfavourable to its precipitation. Whenever metallic gold has been carried into the ocean, the corroding influence of the halogens, in solution of its waters, has disintegrated and destroyed it; and to their influence, possibly, may be referred the fact, that no gold has been found embedded in untrans-

mented aqueous rocks of marine deposit—in other words, the aerial elements do not affect gold, the marine elements have destroyed it.

We have, however, no reason to suppose gold ever appeared in former geological ages; and from the fact, that no gold has been observed interstratified with any aqueous rocks, and the bones of gigantic mammalia having been found in auriferous *detritus* in Russia, in California, and in Australia, it may be rather inferred that there has been an auriferous epoch, contemporaneous with the extinction of the mammoths, following, or late in, the tertiary epoch, and preceding, or early in, that of man.

Electricity and magnetism are sometimes said to have been active agents in originating metallic gold; but, beyond those general laws of electro-chemistry by which physical phenomena are attributed to the electro-positive and electro-negative poles of atoms, and chemical change is said to be the mutually attractive power of electro-positive elements or bases, and electro-negative elements or acids—and the precipitation of one metal by another may belong more properly to these sciences—I do not perceive these forces have otherwise been particularly active in the operation.

I avoid attempting details of science beyond my capacity, but am persuaded this rough sketch will throw light on a subject shrouded in much obscurity, and I conclude with recapitulating:—

1. Alluvial gold has been precipitated from a volcanic fluid.

2. The hot fluid has cooled into solidity, and disappeared by slight denuding forces or by deliques-



cence, or perhaps sometimes in a saline liquid, without assuming a solid form. I have termed the substance in any of these cases a *perishable lava*.

3. The gold has frequently been melted into its bed, as is well known to every digger experienced in working deposits in hard slates.

4. The relation of gold to chlorine and oxygen indicates the agent connected with its deposit, and shows plainly why gold has remained a pure metal whilst other metals have perished.

5. The ocean is the reservoir into which the perished lavas have been received, and the quantity of chloride of sodium in its waters is a standing evidence of what their nature has been.

6. All the phenomena are compatible with the unalterable laws of chemistry, and with a theory of volcanic eruptions, already proposed by geologists.

7. Auriferous quartz veins and other dykes are the probable fissures of discharge.

I believe it is not beyond the reach of science to discover and determine with a degree of precision, by examination of their remains and of their effects on subjacent rocks, with inductive reasoning, based on established laws of chemistry, the elementary ingredients of which the destroyed auriferous lavas have been originally composed.

I am Sir, &c.,

SIMPSON DAVISON.

Sydney, April, 1854.



